DOCUMENT RESUME

ED 279 333 IR 051 804

AUTHOR	Shaw, Debora, Ed.
TITLE	Human Aspects of Library Automation: Helping Staff and Patrons Cope. Papers presented at the Annual Clinic on Library Applications of Data Processing (22nd, Urbana, Illinois, April 14-16, 1985).
INSTITUTION	Illinois Univ., Urbana. Graduate School of Library and Information Science.
REPORT NO	ISBN-0-87845-072-6
PUB DATE	86
NOTE	135p.; For the proceedings of the 1984 clinic, see ED 267 735.
AVAILABLE FROM	University of Illinois, Graduate School of Library and Information Science, Urbana, IL 61801 ($15.00 plus $1.00 postage).
PUB TYPE	Collected Works - Conference Proceedings (021) -- Viewpoints (120)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Adolescents; Children; Disabilities; Human Factors Engineering; Instructional Materials; Library Associations; *Library Automation; *Library Personnel; Library Planning; *Online Catalogs; Privacy; *User Needs (Information)
IDENTIFIERS	Office Automation; Vendors

ABSTRACT

This collection explores the human aspect of the automation and reautomation of library functions as both library staff and library users are expected to adapt to and use computers. A brief introduction by Debora Shaw sets the stage for the following papers: (1) "Terminal Paralysis, or Showdown at the Interface" (Sara Fine); (2) "Learning from Office Automation--Ergonomics and Human Impact" (Marvin J. Dainoff); (3) "Personnel Considerations in Library Automation" (Margaret Myers); (4) "Automation Planning and Implementation--Library and Vendor Responsibilities" (Jane Burke); (5) "Online Catalogs and Library Users" (Anne Gilliland); (6) "Online Catalogs and Specialized Clienteles--Children and Youth" (Susan Roman); (7) "Online Catalogs and Specialized Clienteles--Handicapped and Other Populations" (Leslie Edmonds); (8) "Designing Effective Instructional Brochures for Online Catalogs" (Mark W. Arends); and (9) "Library Privacy in Context" (Jonathan Pratter). The edited transcript of a panel discussion on staff involvement in library automation is also included and an index is provided. (KM)

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Human Aspects of Library Automation: Helping Staff and Patrons Cope

Edited by
DEBORA SHAW

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HUMAN ASPECTS OF LIBRARY AUTOMATION: HELPING STAFF AND PATRONS COPE

Papers presented at the 1985 Clinic on Library Applications
of Data Processing, April 14-16, 1985

Clinic on Library Applications of Data Processing: 1985

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ISBN 0-87845-072-6 ISSN 0069-4789

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Introduction

The Twenty-Second Annual Clinic on Library Applications of Data Processing focused on the human aspects of library automation: helping staff and patrons cope. The topic is of considerable importance, as more libraries and more librarians face the prospect of automating or reautomating library functions. The meeting was held 14-16 April 1985 on the University of Illinois campus.

As computer applications are extended beyond the single purpose back-room functions they initially performed, both library staff and library users are expected to adapt to and use computers. What can be learned from libraries that have led the way with these changes? What can researchers from other disciplines contribute to our understanding? Clinic speakers addressed these and other questions as they explored several of the human aspects of library automation.

Sara Fine is a psychologist who has investigated librarians' resistance to automation. She discusses the range of reactions to computers in libraries and stresses the importance of acknowledging the individual's reactions on a psychological level rather than simply providing technological answers to expressions of emotional concern.

Appropriate design of workstations is of particular importance with increasing computer use by library clerical staff and others who spend long periods of time working at terminals. Studies of office automation have pointed out the need to consider ergonomics—the design of equipment to meet humans' physical needs. Marvin J. Dainoff has researched this topic for the National Institute of Occupational Safety and Health, among others. He summarizes the ergonomic issues that contribute to our reactions to automated systems.

Moving from physical to economic and interpersonal aspects of library employees' reactions to automation, Margaret Myers surveys recent developments in personnel administration in relation to automation issues. Jane Burke continues the exploration of responsibilities for successful implementation of an automated system. She describes potential problems or areas often overlooked in the relationship between the library and the automation vendor. This look at staff involvement in library automation concludes with a wide-ranging discussion by Judith Drescher, a public library director; Christopher Syed, representative for a library automation vendor; Barbara Shaw, a clerical employee in an academic library; and Stella Bentley, who has worked on implementation of a multicampus automation system for an academic library.

Concern for library users' access to automated systems is addressed from a variety of viewpoints. Anne Gilliland discusses user reactions to online catalogs and provides a review of both physical and intellectual aspects of online catalog access. Susan Roman and Leslie Edmonds extend this concern for library users' access to catalog information, stressing special considerations for children and youth (and associated adults), the physically and mentally disabled, the elderly, and library users who do not speak English.

Almost all libraries with online catalogs use written instructions—signs, sheets, or pamphlets—to assist users. Mark W. Arends, professor of art and design, reviews many of these instruction sets and recommends guidelines for producing clear, readable instructional brochures for online catalogs. Finally, Jonathan Pratter discusses privacy aspects of library automation in the light of principles on fair information practices and librarians' traditional interest in the confidentiality of library records.

This Clinic on Library Applications of Data Processing was cosponsored by the University of Illinois Graduate School of Library and Information Science and by the Indiana and Chicago Chapters of the American Society for Information Science. Partial support for the clinic was provided by the Illinois State Library through a grant under the Library Services and Construction Act.

—DEBORA SHAW
EDITOR

SARA F. FINE
Professor
University of Pittsburgh

Terminal Paralysis or Showdown at the Interface

In 1978, the first of a series of national research studies was undertaken at the University of Pittsburgh on a phenomenon that was beginning to attract attention in librarianship—resistance to technological innovation.[1] The application of technology to libraries was already in full swing and attention to the "barriers" to innovation and implementation was just beginning to hit the literature. Librarians, it seemed to some, were not moving fast enough. Librarians just did not seem to understand what was good for them. The reasons? The library literature gave plenty of reasons—because librarians are fearful, timid, traditional, too lazy to learn, too entrenched in their ways, too possessive of their territory. In short, librarians were resistant to change. Resistance was seen as a single and simple phenomenon, a diagnostic label applied without discrimination to any behavior not seen as progressive or innovative or decisive. Resistance was an accusation, an exhortation, a cause for irritation and frustration to those who designed and planned for—and then managed—technological innovation.

Much has changed since 1978. Technology has bounded into our lives, converging on us to change the way we live, love, interact, move about, cook our food, manage our money, communicate, heal the sick, create music and define art, fight wars and make peace. And with these changes in our lives have come changes in attitudes and beliefs. From viewing technology as an alien force, we have come to accept it as our trusted and necessary companion as we march into the future, providing us with new and better ways of doing things. Today everyone knows that technology makes for a better way of life. Or does everyone?

I would like to go back to 1979 when the first study of public librarians and resistance to technology was completed. Looking back, I now realize that the results were not only *findings;* they were predictions.

Here are some of the predictions we uncovered. First we found that resistance to technology was alive and well. Our study suggested that for every four people in a user system happily tripping down technology's Yellow Brick Road, a fifth was trying desperately to hold them back. And what about today? Except for organizations that specifically hire people because they are technologists, every study, every discussion with administrators, every survey—even with student groups—confirms that 20 percent of the members of any library organization will be actively or passively resistant to technology living their lives in fear or anger, or trying to fade into the background, hoping it will go away. There does seem to be one major difference, however, when we look at how people react to technology today. We do not seem to recognize resistance as easily anymore. Perhaps it has gone underground and is silently festering and growing. Or perhaps it has taken on new manifestations and altered forms. There is research evidence to suggest that resistance to technology is still alive and well.

The problem has not gone unnoticed. In fact, it is receiving a great deal of attention in the popular press these days. Just as technology has reached just about every aspect of our lives, so has "The Problem" of resistance grown in magnitude—to the bewilderment of some, to the amusement of others, and to the relief of the silent sufferers. In fact, resistance is "in." When I started my studies seven or eight years ago, they were seen as "quaint." Not so today. Now they are seen as "significant." I have just been asked to write a column for the Pittsburgh *Post Gazette* under a series titled "Ask a Psychologist" for people who are experiencing this newly recognized "mental disorder." It will appear in the series right before an article on new treatments for depression and will be followed by an article on the symptoms of alcoholism. Resistance—or as the current jargon calls it, "technostress"[2] or "technophobia"—is keeping pretty good company these days.

But while studies of resistance have aroused great interest, the face and flesh of resistance are still out of focus. There are some issues in human life that are so universal and so predictable that we smile at them, or we point to them with annoyance; we certainly do not take them seriously. We patronize and indulge them in others; we are embarrassed by them in ourselves. Falling in love is one example. Resistance to technology is another. We used to treat resistance like puppy love with a pat on the head and assurance that it will go away. But talk of resistance has become fashionable, and along with it are other fashionable concerns: librarians and stress, librarians and anxiety, librarians and coping, librarians and burnout. I do not think it a coincidence that concerns about resistance to technology and concerns with work stress have come about at the same time. The studies predicted that while technology is here to stay, resistance is also here to stay. If we are going to have the one, we had better learn to understand the other. They come together like two offspring of the same parent.

Another finding, another prediction. What do people fear most about technology? That they will lose their jobs? That they will feel embarrassed because they cannot learn to use it? That it will not work, that it will break down? People fear all of this, but what they fear most is the breakdown of interpersonal relationships. That is what they feared seven years ago and in every one of the subsequent studies. Technologists dismissed the fear as irrational. After all, they said, technology is just a tool. But workers today find that electronic mail systems, automated workstations, and the intense concentration required by the terminal itself can indeed produce an altered state, a lonely state. It was interesting to note that many librarians in the studies reported the perceptions that librarians are people-oriented while technologists are machine-oriented. A stereotype you say? A generalization? A false impression? Current research on the subject suggests that computer people have relatively lower social needs in their psychological makeup than do nontechnologists. The perception may be accurate.

There have been a number of studies on the social effects of technology—the alienating effects. Psychologists have become very interested in the dynamics of "hackers"—those who are stuck on technology. Sherry Turkle sees them as a group of people who represent the extreme of something that many of us experience on some level and to some degree. We are fascinated with hackers because we see in them something we fear in ourselves. They carry to an extreme a vulnerability to which all of us are susceptible. The theme of modern life, Turkle suggests, is a sense of numbness, a paradoxical fear of intimacy yet an equally strong fear of being alone.[3] The computer offers companionship without intimacy. Its interactive nature makes it different from any technology we have ever known before—more seductive, more powerful, and more frightening. Perhaps it is the fear of seduction by the computer that is truly at the heart of all resistance.

There are a couple of other findings that I would like to highlight. Being a psychologist, one of the first questions I wanted to answer was whether resistance is a function of a certain "librarian personality" type. I wanted to know if the reasons for resistance described in the library literature were accurate. Is the librarian by nature resistant to change? The answer is no. In fact, I did not find a librarian personality profile. Apparently the librarian is no longer the asocial, asexual, compliant milquetoast of earlier studies. And, apparently, resistance to technology is not a vice, a disease, or a personality defect. It is not the same as malingering or malcontentedness. It is experienced by flexible, adaptive, progressive people as well as by rigid, difficult, and traditional people. It can be experienced by the most surprising people in the most surprising places.

However, resistance *is* related to whether or not people perceive themselves as part of the decision-making process in their organizations or whether decisions are made at the top without consulting the people who have to do the work. It has become an axiom in management theory that people who will be affected by change ***should participate*** in planning for change. Every modern change strategy says so; every article on change stresses it; every consultant echoes it. But the managers of many organizations, in dealing with their own staffs or users or consumers, only give lip service to the concept.

The interesting paradox here is that when a manager is planning for technological change, he also often thinks that he is successfully changing the attitudes of his employees. The mistake that many managers make is to confuse conformity with acceptance. The distinction is significant because it relates to one of the important principles of modern social psychology—that under certain conditions, *less* social pressure can produce *more* attitude change. The most profound and enduring changes in attitude occur under two conditions: one, when people perceive that they have free choice in deciding to behave in ways that are contrary to that which they currently believe and choose to do; and two, when the pressure applied is just strong enough to get their attention. People are funny about their attitudes. They cling to them lovingly and stubbornly. Attitudes about technology, for example, either positive or negative, seem to remain the same, even in the face of clear and irrefutable evidence to the contrary. When we try to argue or cajole attitudes away, what do we get? A polite acquiescence or a "Yes, but..." argument. When was the last time someone told you to change your attitude—and you did?

But people are funny about something else. It makes them very uneasy to behave in ways that are contradictory to their beliefs. It produces a particularly uncomfortable state of dissonance. In some instances it produces that terrible state called guilt—the dissonance between the act and the belief. The tension is particularly great when people feel that they have freely chosen to act as they do, without external force or pressure. After all, if an action can be blamed on an outside force, that can reduce the tension. But if the action is chosen, people will eventually bring the action and the belief into harmony; in essence, people become their own agents of self-persuasion. It is as though they said to themselves, "If I chose to do it I must have unconsciously always liked or wanted to do it." The librarians in the early studies, with some kind of intuitive wisdom, pointed this out. High resistance was related to a low perception of decision-making power. Without the sense of choice, the self-persuasion mechanism is not activated. The message was clear.

The studies showed too that another major fear that people had was that technology would subtlely and gradually invade and inhabit their privacy. "Nonsense," laughed the technologists. "Why don't you people realize that technology is just a tool, just a better tool for doing what we've always done?" And if that argument was not enough, they added, "What's so great about privacy anyhow?" When he was asked about the privacy issue in an interview, Isaac Asimov pointed out that we gave up our privacy to the Internal Revenue Service long ago. If you are worried about privacy, Asimov continued: "The best guardian of privacy is to arrange your life so that you are a total bore and nobody wants to know about you."[4] And so the concern was dismissed with an offhand "So what?" But some of us knew it was coming; the day when every transaction—whether it concerned the food we bought, the TV programs we watched, the items that we shopped for, our various identification numbers, the money we spent—would be subject to electronic recording. In 1978, the librarians who responded to our questions could not fathom the degree to which, in a very short time, we would give up our privacy or with what grace and compliance we would accept its passing. But the resisters predicted it and warned against it. Today it is *only* the resisters who still hold that naïve belief that their private lives are not public. After all, they reason, if you refuse to use electronic banking, your bank statement may remain sacred and confidential.

There was another prediction, or, perhaps more accurately, there was one other observation on the nature of human reactions to technological change that emerged. Two of the questions asked were as follows: First, do you agree that technology has the power to control our lives? The majority of respondents—then and today—answered affirmatively. The second question asked: Do you agree that technology gives us more control of our environment? The majority of respondents—then and today—answered affirmatively! Is it possible, we asked ourselves, that most people, perhaps all people, hold conflicting feelings about the same thing at the same time—i.e., that ambivalence is a universal reaction to technology?

So we went a step further. We interviewed people and asked them to talk through their attitudes, fears, and beliefs. And we asked them this question, whether they were pro-technology or resisters: Does technology cause you any problem, or concern, or fear? We have discovered that not one person gave an unequivocal "yes" or "no!" It is always either "No...except that (we may blow ourselves up)..." or "Yes, many...except that (it saved my mother's life)...." It seems that all of us have mixed feelings about technology and what it means for our lives and our future. I wonder if it also means that in many of us there lives a potential "closet resister" ready to spring forth if we think things are getting out of hand. After all, nobody's psyche is squeaky clean.

Ambivalence is perhaps the most difficult emotional phenomenon for us to cope with, particularly in an age that values conviction, consistency, decisiveness, and goal-directedness. Ambivalence makes planning difficult; it defies rationality. And yet, it exists in all of us, complicating not only our own reactions to the technological evolution, but confounding our attempts to make rational decisions and to influence others who are also subject to its effects.

Ambivalence produces a particular kind of stress, and in order to reduce that stress we produce a variety of reactions. One kind of reaction is denial—it is not happening, it is not a real issue, or it is an issue for the future and has no relevance in the present—the "worry about it tomorrow" syndrome. Another reaction is to intensify one's reaction. The person who responds rationally becomes more intensely rational and the person who reacts emotionally becomes more emotional—in both instances, the "Why don't other people really understand" syndrome. Stress produces two responses: flight or fight. Frightened people run; angry people fight. Ambivalence can produce a third kind of response—paralysis: a sense of not being able to decide whether to stand and fight or run and hide. When a staff member or colleague says, "That's a good idea but it won't work," we may be hearing ambivalence rather than irrationality.

And then there was the one prediction that was and continues to be the hardest one to accept and understand. We seem to believe that if "they"—i.e., people who avoid technology or fear it or reject it—would only listen to reason, they too would see the light and "join the twentieth century." After all, we say, technology is just a tool. But what our respondents showed us back then was that people who are pro-technology and people who are resistant to technology see the world through a different life focus and give technology a different meaning. The key question that we asked was: "Do you agree that technology extends our ability to see, hear, and think better?" In other words, is technology seen as an extension of our own physical senses? Technologists' image of technology is as a part of themselves, an extension of themselves. One respondent who was a chemist and deeply involved in technological applications to his work, talked about the computer and its capability as "the most malleable substance I've ever worked with," as though he were a sculptor working in some wonderful new medium. Resisters, on the other hand, seem to view technology as one more force in their lives, one more obstacle, one more difficult fact of life, and they feel helpless in the face of it.

This is very important information in dealing with resistance because if makes clear that if we are ever going to bridge the gap between "us" and "them," between the "haves" and the "have nots," we must begin by this understanding—we must begin by listening to how the other person sees the world from his own world view. And then, perhaps, we would never again argue that "after all, technology is just a tool." The resisters of 1978 were the predictors of things to come and like all prophets they were the outcasts, the crazy blind beggars of their time. And like all true prophets, their predictions have largely come to pass.

The main point that I would like to make about resistance to technology is that we need it for our survival. In an individual, resistance is a force for self-preservation, a defense against that which we fear or abhor. In any organization, resistance may be an untapped source of information for administrators and planners, pointing against real dangers facing the organization and targeting unanticipated consequences of a proposed change. Many studies show that when confronted with resistance, most managers discount its meaning. Nystrom and Starbuck point out that organizations succumb to crises largely because their managers, bolstered by recollections of past successes, live in worlds circumscribed by their own belief systems and cognitive structures, by their own views of the world. When confronted with resistance, with thinking contrary to their own, most managers label the behavior as a problem. "In every crisis we studied," wrote Nystrom and Starbuck in *Organizational Dynamics,* "the top managers received...warnings and diagnoses from some of their subordinates, but they paid no attention to them. Indeed, they sometimes laughed at them."[5] And how do resisters then behave? Intelligently. They learn to keep quiet, or to sulk, or to act out their resistance in unbecoming and sometimes destructive ways.

Resistance in an organization may have so much value that by trying to wipe it out—like a disease or a species of predator—we may be creating new, unforeseen, and, in the long run, much more serious problems. In essence we say about the resister: "I've tried to work with him. I've offered to train him. But if he can't adapt, there's nothing I can do. He's holding us back." Does that sound familiar? In fact, it is the very purpose and value of resistance to hold us back and create tension with progress. It is the function of the resister to impede progress, just as it is the function of the forward-mover to try to reduce or overcome the resistance. It is out of the tension between pushing forward and pulling back that healthy growth takes place. Sometimes in our haste to be progressive and competitive, we lose sight of our own nature and our own natural safeguards. Resistance may in fact be pointing out that a change is happening too fast. It may be pointed against a change that is threatening the basic values and integrity of an organization, or a profession, or a society. It may be an indication that the technology has surpassed the human factor in importance. The most important thing I have learned about the resistance in all my studies is to respect it. I have also learned some things about the nature of the resistance phenomenon—what it is and what it is not, how it behaves and what it feels like, and how it can function to keep a person or an organization healthy and growing.

In a classic model, resistance behaviors fall into several basic patterns. The first pattern is a decline in the quality or the quantity of work, a form of resistance that is difficult to identify as resistance. Second is a "refusal" pattern manifested by the inability to learn, the unwillingness to be trained, the casual mistakes and neglects, the passive nonuser of the new technology, or the outright and aggressive refusal even to try it. Third are patterns of absenteeism or tardiness or unusual numbers of personal "emergencies." And fourth are behavioral changes: withdrawal or aggressiveness; a general negativism, criticism and rage at the administration; argumentativeness with peers or the denigration of colleagues. If these sound like symptoms of work-stress and burnout, they are. Resistance takes a great deal of psychic energy; it exacts a high price; it is a cause of emotional pain. It cannot be unrelated to stress, either in its origins, its symptoms, or its effects.

While in most organizations today, managers and administrators have become sensitive to these issues, they have also learned that it is easier to understand them than to act on them. Managers have discovered that despite their good intentions, there are factors and forces at work that defy prescriptive solutions. No matter how well an organization plans for change, some people will remain resistant. And what does management do? Believing that everyone sees—or should see—the world as we do, our major resistance-reducing technique is to try to argue or reason it away. When that does not work, we as managers have two fallback positions: to wait patiently or to act aggressively—to wait it out or to weed it out. But there may be another option: to respond to the resistance and to use it productively.

In order to respond to resistance we need to understand it. The resistance phenomenon is a psychic mechanism to avoid that which threatens the individual's sense of stability. It occurs in response to a felt anxiety, the result of unconscious fears that the person is unaware of, cannot put a name to, cannot give voice to. Resistance is not a defense against technology and not against change but a defense against fear and pain.

If we accept as a major premise that resistance is a behavioral phenomenon rather than an economic, social, or moral issue, then we can draw some corollaries and, in so doing, perhaps deal more kindly with our own resistance and expand our repertoire of reactions to the resistance of others. The first corollary is that we are all resistant to some things, some of the time. I would propose that none of us could be described as resistant to technology—as we know it today. But I would venture that if new and radically different technology were to appear on the scene—one that would make the way we work obsolete, devalue our investments of years and resources, leave us without skills and with reduced status, rob us of valued traditions and our valued belief system—then we who are innovators would become the cringers and whiners.

The second corollary is that resistance, true resistance, is an unconscious reaction to a perceived threat, not an act of will. But the rational world does not permit the fear to be acknowledged. It can only be rationalized. Herein lies the danger. We know that there are people who are truly afraid of technological change for whatever reason. We call them "resistant." But there are those among us who are informed, reasoned, even prophetic—warning us of unforeseen dangers and ramifications, reminding us of past learnings and future problems, demanding that we slow down and let our psychological, and social, and legal, and political, and ethical selves mature enough to keep up with a maturing technology. What do we call them? "Resistant." Sometimes intense negative reactions are based on anxiety and fear, and sometimes on reason and foresight. The problem is that they can both sound alike and we cannot always tell one from the other.

A corollary to a corollary. Much as we try we cannot wipe out resistance. It keeps coming back in new and often more virulent forms. There is one thing certain: there is no system that managers can create that the workers cannot beat. There is no system that a library can install that the users cannot avoid. Because open resistance to technology has become an unacceptable position in today's world, it is likely that the resistance is passive, that it comes out as typical "problem" behaviors. Resistance often appears in the form of problem behavior. We all know the worker or patron whose negativism drives us to a frenzy of frustration. We have all experienced the other symptoms: the failure to complete a task or the inability to learn something new, or the illnesses on days when training is scheduled to take place. The fatigue, the whining, the nitpicking, may not always be signs of a mental aberration but the acting out of resistance. If it is true resistance, the illnesses feel real, the tardiness is explainable, the inability to learn can be justified. It is important in dealing with resistance to remember that while it may not be rational, it can be rationalized. The explanations are argumentative but the sound is logical. It is important that we deal with the resistance and its source, not the rationalization, its symptom. In other words, if someone says, "That's a good idea but it won't work," don't ask him, "Why not?"

Along with the predictable forms of resistance that I have been describing, a new crop of alternative and more subtle symptoms of resistance has been activated. While these symptoms are harder to detect, I believe that in the long run they are more damaging to the organization and more painful and destructive to the individual who is experiencing them. What are some of the resistance behaviors and reactions that are currently in mode? What are some of the learned behaviors that resisters have acquired?

One of the most universal forms of resistance is apathy. Resisters to technology are tired of it all. No longer are they petulant, obstinate, or critical, for these behaviors do not work anymore. While the rest of us become more and more committed to technological growth, resisters are bored, and there does not seem to be anything the rest of use can do about it. When facing the reality of technology, resisters may well choose the passivity of boredom rather than the activity of aggression.

But not all resisters are content with so much passivity. They may disguise their hostility as humor. Current interest in corporate cultures has taught us that stories, rituals, symbols, jargon, and jokes reveal underlying beliefs and values. The message behind black humor is loud and the rage it masks is strong. One of the measurement devices that we used in the studies of resistance was cartoons about technology, asking our subjects to rate them on whether there was some truth hiding behind the humor. Resisters saw both humor and truth. Technologists did not even think the cartoons were funny! Like apathy, cynical humor is a subtle and sophisticated form of resistance. Its effectiveness lies in the fact that we value and need humor in our working lives, and the line between healthy humor and destructive humor is hard to define or even identify. But when it contains a quality of anger it is likely to be a manifestation of resistance. A wonderful example of black humor is a cartoon that has been circulating for some time. A skeleton sits in front of a dead terminal, bones beginning to turn to dust. In walks a workman with a tool kit. "System been down long?" he asks.

Here is a third example of new and learned resistant reactions. A few creative resisters have even managed to develop classic phobic reactions to technology. I am not talking about people who are reporting physical effects and strains from intense work at computers. I am talking about true phobic reactions—the result of change-induced tensions.

At Stanford, the syndrome is termed "computerphobia." At the San Francisco Phobia Center it is called "technophobia." At the Wharton Computer Center of the University of Pennsylvania they have been called "closet cyberphobes" suffering from "terminal shock." A study at St. Joseph's Hospital in Philadelphia found that 5 percent showed symptoms of classic phobia: dizziness, nausea, cold sweat, and high blood pressure. At the Veteran's Medical Center in Portland (Oregon) it has been termed "a new mental disorder." Reports about people who have strong psychological or physiological reactions to computers have begun to appear in a variety of sources. There is nothing inherent in computers to cause these reactions. The phobic symptoms are a new, learned form of resistance.

So apathy, sick humor, and phobic reactions have become some of the symptoms-of-choice for today's resisters allowing a seemingly harmless expression of distress and distaste for what is happening. But some resistant behaviors and some resistant reactions are truly destructive either to the individual or to the organization—or both.

One such symptom is the emergence of a strong and sometimes deadly "we-they" feeling. "We," the staff; "they," the administration. Or "we," the humanists; "they," the technocrats. Or "we," the steady, sober folks; "they," the young systems people. There are studies that suggest that technology is becoming one more male status symbol, once again unbalancing a hard-won professional and personal equality between the sexes. It often happens that resentment toward the behavior of technologists is displaced as resistance to the technology. Our studies suggested that resisters (and many nonresisters as well) have perceptions about technologists. Some perceptions are, for example, that technologists are all young ("All systems people are under 12."), brash ("They all are lacking in breeding and manners."), and arrogant ("They all think they are better than everyone else."). Technology determines the high and low status that people hold in organizations and separates the "have" and the "have-not" people in society. The "we-they" affliction is painful to those who have it and harmful to the environment. Technology seems to trigger a severe case of it.

Another form of learned resistance is frustration and rage, the result of high expectation leading to dependency and followed by disenchantment. Some psychologists believe that our frustration with technology and our rage when it malfunctions is the most insidious price of our dependency. The general rule is that the more dependent you are on anything the more apt you are to become furious—spontaneously, impulsively enraged—when it does not work as expected. Once we lose our belief that the machine is infallible, we feel betrayed and we rage at the machine. It is the classic pattern of the rage and longing for revenge of the betrayed lover.

Another symptom, one that can be devastating to the organization, is sabotage—making sure that the system does not work. True computer phobics only have two behavior alternatives: fight or flight. People who are computer-resistant are often afraid to reveal it. It could mean their jobs or their management positions. When it is severe enough, the resister may start to complain, not about the technology but about the job, the work conditions, or the supervisor; eventually he will be impelled to leave, to choose the second of the two alternatives—flight.

The other alternative is to fight, and for the computer phobic that may take many forms. For example, in a study of resistance to technology in hospitals, misuse or nonuse of a new technology was explained away because "It's more important to give care to patients than to use the technology." The illogic is not apparent to the resister. Another subtle form of sabotage is "shadowing" or "shoebox" behavior—the manual paralleling of computer functions or maintaining duplicate records in writing thus increasing the cost in time and reducing the efficiency of the system. There have been studies of system failures in businesses, service agencies, and hospitals, where incorrect data input has been traced to a computer malcontent working within the system, behavior that resulted in serious delay in implementing the system and sometimes causing serious damage to its operation. Sometimes the vendor has had to remove the system—and will never know why.

What can you expect from the showdown at the terminal, when user and machines are finally face to face and your job is to give birth to the interface? Many—perhaps most—of your users will learn and adapt, some faster, some slower, with a little grumbling and a lot practice. It is likely that one in five will be a true resister. How will you know them? What will they do? Here are some predictions—and a few admonitions.

The major symptom of resistance and the hardest one to counteract: they will become nonusers. They will choose flight over fight. Or they will develop a rationalization, a belief system that keeps them safe and comfortable. As, for example, the hospital worker I described. Another kind of belief system that I found in a study of resistance in social service workers was this: "If I can't find the information without the technology then the information doesn't exist. Or if it does, it probably isn't what I want anyhow." You can see how powerful this resistance mechanism can be.

Or they will become aggressive, not toward the technology per se. They will displace it onto something or someone nearby. Or, they will become childlike, whiny, helpless, unable to learn. They may experience a psychic paralysis, a "terminal paralysis." Or, they will circumvent the system. Don't ask me how. They will figure out a way to work around it. And they will tolerate a lowered quality in their work and rationalize it. And at the same time they will experience both pain and rage.

And whatever form their resistance takes, they will experience an increase in their stress level and long for days gone and times past. They will grieve for the loss of times they knew and comfort they loved.

The only thing I know to do with resistance, as a clinical practitioner working with individual clients or as an organizational consultant working with staffs and users, is to first respect it. Second, try to understand its meaning for the person experiencing it and then talk it through. But talking it through does not mean arguing it out.

Talking it through requires that you respect an essential, inalienable right that the resister has—the right to feel. It has become something of a truism in the age of technology that we are in the presence of a profound and revolutionary movement whether we are ready for it or not, whether we like it or not. And it is something of a truism that emotions do not belong in the working world. And, therefore, all expressions of fear, distaste, and distrust of the changes taking place around us are unacceptable and embarrassing. Saul Alinsky once pointed out that Americans would rather die than be embarrassed. One of the reasons that the right to feel is so blatantly violated in the work world is because it is so easy to be embarrassed by feelings and so tempting to use their nemesis, *reason,* to deflate them.

In this technological evolution through which we are living, there are many pressures on us, many uncertainties, many risks. We discover several truths about technological change very quickly. We find that time projections are unrealistic, systems do not always respond on demand, and efficiency goes down and stays down longer than we had anticipated. We live with glitches and bugs and slowdowns and shutdowns. It makes it hard for us to deal with people who are marching to a different beat. But if we listen to the voice of resistance, perhaps we will hear another voice of reason.

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MARVIN J. DAINOFF
Director
Center for Ergonomic Research
Miami University
Oxford, Ohio

Learning from Office Automation: Ergonomics and Human Impact

Introduction

I am by no means an expert on library systems. My primary connection with such systems is that of the typical university professor—i.e., I am a patron. However, I do know something about office automation. In particular I know some things about some of the problems involved in implementing office automation systems, particularly regarding the interaction between human beings and computer systems. Therefore, from my perspective, the issues surrounding automated library systems are a particular instance of general issues of office automation.

It is, by now, somewhat less than startling to make the statement that the advent of inexpensive computing power has produced a radical transformation of those daily work activities that have come to be labeled the "information handling" professions. Information handlers (formerly "white collar workers") tend to spend their workdays in something like an office, and, since at least 1980, they have constituted the majority of the U.S. workforce.[1] Furthermore, information handlers are increasingly more likely to be processing information in electronic form, by communicating with some sort of computerized system via a video display terminal (VDT). Predictions are that by 1990 from one-third to one-half of all U.S. workers will be using some sort of terminal for all or part of their workday.[2] What this means is that an increasingly larger proportion of the working population will perform an increasingly larger proportion of their daily work activities by interacting with a VDT. Most of what we have come to mean by "work"—whether we are senior professionals or entry-level clerks—will involve sitting in a relatively fixed posture while manipulating a keyboard and peering at a display screen.

However, we have now already had some ten to fifteen years' experience with VDT use on a relatively wide scale, and there seems to be evidence that this experience has not been without its cost. Complaints regarding health problems among operators of VDTs began to appear in the mid-1970s and reached a point such that, even in 1977, a trade magazine could describe them as "epidemic" in nature.[3] These health complaints have tended to fall into three areas:

1. physical strain—primarily in the visual and musculoskeletal areas;
2. concern over the levels of electromagnetic radiation emission; and
3. psychological strain.

Since my own experience has been primarily in dealing with the first category, I will concentrate there. With regard to the other areas, I think it is fair to say that most radiation experts have been fairly well convinced that VDTs do not emit sufficient levels of radiation to present any kind of health hazard.[4] Discussion of psychological issues deserves its own separate treatment, perhaps at another time.[5]

The main argument will be that primary causes of visual and muscular problems among VDT operators are likely to be ergonomic in nature. Explored in some detail will be the causes and potential solutions for many of these problems and it will be argued that their solution will lead to an "everybody wins" situation in which productivity increases while operator complaints decrease.

The Ergonomic Argument

First, ergonomics should be defined. *Ergonomics* is an applied science concerned with the fit between people and the things (tools, equipment, environments) that people use. Ergonomists study the characteristics of people—both physical and psychological—as these characteristics interact with the physical design of objects, in order that the use of such objects may be made as effective, healthy, and safe as possible. (Synonyms for ergonomics in the U.S. are *human engineering, human factors,* and *engineering psychology.*)

A fairly comprehensive literature[6] suggests that a likely cause of at least a portion of the high levels of eye and muscle complaints of VDT operators are likely to be the results of ergonomic design deficiencies in existing workstations and VDT equipment, particularly among operators required to maintain fixed postures for relatively long periods of time.

During a two-year visiting appointment at the National Institute for Occupational Safety and Health, I attempted to verify this argument in the laboratory. My colleagues and I[7] conducted a series of laboratory simulations of VDT data-entry work in which operators, working three hours per day without breaks over four days, alternated between workstations which were either well designed or poorly designed from an ergonomic perspective.

The results of these ergonomic simulations supported the original argument. The same individuals doing the same kinds of work were seen to produce higher levels of output (keystrokes per minute) while showing fewer muscle complaints in the well-designed workstation as compared with the poorly designed workstation. These results were repeated in two similar studies. A field study by Springer reports similar findings.[8]

These reports, along with a number of unpublished, less controlled investigations from the field (including my own workstation at home!) lead to a fairly convincing justification for taking ergonomic design seriously. Of course, an increase in productivity will grab everyone's attention, but what about the health complaints? How seriously should these be taken?

The fact that "almost everyone" suffers from back pain and a bit of eye strain occasionally may act to trivialize these problems, but in fact their very widespread nature increases their economic importance as a health issue. Studies from Sweden where health records related to occupations are carefully collected[9] indicate that the single largest category of occupational disease (over 50 percent of total cases) is described as ergonomic in nature. That is, these disorders are associated with strain resulting from static postures in which the worker is required to maintain a fixed position for long periods of time. Working at a video display terminal is not the only such category of occupation, but certainly it is becoming a major one.

Posture

Postural Strain

This discussion of postural strain will be restricted primarily to those situations where a worker is sitting for prolonged periods of time. From a fundamental, analytic point of view, sitting is a very interesting and complex form of behavior. The fact that it is so common, familiar, and so overlearned does not minimize its ergonomic importance.

Sitting at a workstation embodies at least two functional requirements that are often contradictory. The first requirement is to support the mass of the body against the force of gravity. Under normal conditions, of course, the body cannot maintain itself upright on its own but requires specific action by sets of so-called antigravity muscles that keep the body in an upright posture by acting against the force of gravity. When one faints, he or she loses consciousness, the antigravity system no longer functions, and the individual collapses. In the case of seated posture, the muscles are helped out by the various horizontal and vertical surfaces of the chair. These surfaces allow the weight of various portions of the body to be supported.

The degree to which this support is required depends initially on the nature of the work that is being done. As an example, a friend of mine is an ophthalmologist who does microsurgery involving corneal implants. His workstation, which costs thousands of dollars, is a chair with a microscope built into it. For the ophthalmologist to work effectively, he is required to have his body absolutely rigid in order for his hands and eyes to be completely supported. The information-handling tasks we are all concerned with are not quite as demanding, but still require that the primary interface points—the VDT, the fingers, and the eyes—be in proper orientation with respect to the keyboard and screen. The first requirement of a workstation is to provide sufficient support and stability so as to allow these crucial body components to interact properly with the physical characteristics of the workstation—namely the keyboard and screen.

However, the first criterion is inevitably in conflict with a second demand which has to do with the biochemical nature of fatigue. At a simple muscular level, fatigue results from a build-up of lactic acid. Lactic acid is a by-product of the conversion of blood sugar to ATP (adenosine triphosphate), which is required to give energy to muscles. This is a normal process that goes on continuously with all muscles. However, what we know and experience as muscle fatigue occurs when this lactic acid by-product is not removed quickly enough by the blood. It is interesting that the removal of lactic acid is enhanced by the increased blood flow which results from motion. Under ideal conditions, muscle contractions can go on almost indefinitely if the removal of lactic acid occurs at the same rate as its build-up. A good example of this would be the simple case of someone walking who is in even moderately good shape. One can walk for fairly long periods of time without stopping to rest. This is because the muscular activity involved in moving forward is at the same time generating sufficient blood flow to remove lactic acid.

Sufficient blood flow to remove lactic acid is not generated by the seated worker. Since there is little or no movement, the blood supply is minimal. In fact, most seated postures hamper the flow of blood. This is because the primary veins of the body, located on the back surface of the legs and thighs, are compressed while seated at a chair, therefore, the normal return flow of blood to the heart while slowed down by the lack of activity is even further hampered by the blockage of these veins. Thus lactic acid builds up and causes fatigue. In order to counteract this, there is the tendency for the body to move homeostatically, that is to want to shift and squirm in order to move to allow the blood flow to occur. A well-designed workstation will simultaneously allow for both of these functions. That is, it must provide adequate support while at the same time allowing for adequate movement so as to enhance blood flow.

Requirements for Workstation Design

Having defined the problem of static load as a major contributor to fatigue and having described other possible problems of muscle functions, there are some relatively simple requirements that can operate at least to minimize fatigue thus allowing energy resources to be used for more effective performance.

Standard recommendations. Current understanding of the biomechanics of the muscle function has led to proposed recommendations for VDT workstation design that would require minimum levels of muscle activity in order to maintain the operator in proper orientation with respect to keyboard and screen.[10]

These recommend that the workstation be designed in such a way as to allow feet to rest solidly on the floor or on a footrest in order to anchor the lower limbs of the body. The angle between the thigh and lower leg should be approximately 90 degrees. The angle between the thigh and trunk should likewise be 90 degrees. The lower or lumbar region of the back should be supported by a backrest. The elbows should be approximately at the level or perhaps a little below the level of the home row of the keyboard and the wrists should be flat. The head and neck angle should be such that the line of view between the eyes and the screen or copy should be about 15 degrees below the horizontal. However, this is only one dimension of the problem. In addition, the operator should be allowed sufficient flexibility to be able to move around and shift position.

Flexibility and adjustability. It is fairly obvious that people differ in size and shape. However, in the past, workstations have been designed with reference to a set of "average" human dimensions. A simple demonstration can point out the mythological nature of this "average" human. Take any relatively large group and ask how many people are average with regard to weight. Probably a fairly large number of individuals would be within a few percent of the U.S. average—166 pounds for males, 137 for females. Now, of those individuals who are average in weight, how many are also average in height (68 inches for males; 63 inches for females)? I would suspect the number would decrease drastically. Moving to other body dimensions that are crucial for workplace design, such as seated elbow height (the height of the elbow above the floor), seated eye height (the height of the eyes above the floor), and so forth, we find very rapidly that the concept of average is completely misleading. Virtually nobody is average. Traditional practice has been to take an average set of dimensions and expect all individuals to fit them. But no one fits them precisely. We would not tolerate the clothing industry having only one set of clothes to fit everyone; however, we are willing to accept this with regard to furniture.

What are the consequences of not taking these differences in body measurements into account? Most people are aware of these consequences: your chair is too short, your chair is too tall, the work surface is too high, the work surface is too low. All of this puts added strain on the body increasing the likelihood of fatigue discussed earlier. Therefore, a major ergonomic principle has to do with the ability to adjust the components of the workstation. That is, the office furniture must be of sufficient flexibility so that an operator can get himself or herself into the optimal posture already described. To accomplish this requires being able simultaneously to adjust the keyboard height independently of the screen height and tilt and independent adjustment of the chair height. Furthermore, adjustments must be possible for individuals of different sizes and shapes.

On ergonomic chairs. Let's concentrate on the chair in more detail. The standard recommendations just described assume that the operator is sitting upright with the chair providing a sort of bulge in the lumbar or lower region of the back. The reason for the lumbar bulge relates to the difference between the posture of the spine while sitting and standing. In standing position, the normal curvature of the spine takes on the form of an "S." In the lumbar (lower back) region, the spinal curve has a forward bend. The spine segments are flexible, and in seated posture, the pelvis rotates backward and this bend tends to reverse. The result is that the disks that are located between the spinal segments are compressed and tend to be displaced backward against the ligament, causing pain.[11] It has been demonstrated that the pressure on these disks can be exceptionally large when leaning forward in a chair with no support—a situation many office workers find themselves in daily. Although not demonstrated clinically, this is a likely source of back pain.[12]

If one sits upright in a chair with a lumbar bulge or support, lower back pain can be minimized. The lumbar bulge, which is part of the backrest, works against the reversal of the S-curve. Thus, chairs that are labeled "ergonomic" should have some sort of lumbar support.

Additional features of an ergonomic chair are concerned with the ability to give good support to the back while at the same time adjusting the seat height to a sufficient range so that a relatively large number of people can get into an optimal position. Further, these adjustments should be able to be carried out easily from a seated position. The old system of having to get down on hands and knees and spin the little collar on the chair around simply never worked. No one ever took the trouble to do it.

A new piece of technology called the gas cylinder has allowed a whole new range of flexibilities. The gas cylinder is the same hydraulic device used in a car with a hatchback to keep the hatchback up. These cylinders have been incorporated into chairs and allow for push-button control. However, fixing posture into one optimal orientation solves one problem but exacerbates a second: the homeostatic component. That is, even a chair with a proper lumbar support which puts the worker into an anatomically correct posture will still not be the complete answer because of the necessity for the body to move about.[13] In fact, although ergonomists have recommended the upright seating posture for years, field observations confirm that very few people, if given a choice, will actually remain in this position for long periods of time.[14] The preferred posture appears to be backward leaning. Thus we now need to incorporate into the current ergonomic chairs a back tilt option, a second set of buttons allowing the seated worker to move the chair to a backward-tilt position.

Focusing now on the complete workstation as a total system—involving the *interaction* of desk, chair, and terminal—there is a further problem. As you lean backward, the angle between upper and lower arm will no longer be the optimal 90 degrees; and presumably, the result will be an increased fatigue tendency in these limbs. If the keyboard support surface happens to be adjustable, it could be raised sufficiently high to preserve the 90-degree arm angle; however, this introduces yet another problem in that there is now an acute angle at the wrist. Since the wrists are particularly sensitive to pressure, particularly in situations where people are working for prolonged periods of time, it is necessary to flatten the angle between the hand and the arm. To accomplish this, the desk or workstation needs a device called a palm or wrist rest. This is a padded structure that goes in front of the keyboard and allows the wrists to flatten out.

Now the operator is comfortably leaning backward, his/her arms at a 90-degree angle, the hands accurately in place against a raised keyboard, and the wrists flattened by a palm/wrist rest. However, can he/she still see the screen or copy? An additional concern which is inherent to the backward tilt posture is visual in nature. The operator has moved *away* from the text. This may or not be a problem, depending on the operator's eyesight as well as the size of screen characters and copy. Screen characters tend to be larger than those on paper copy, and if one has to deal with Library of Congress cards, I suspect the backward tilt will present some real difficulties.

A solution to this problem is found in some models of ergonomic chairs that contain a forward tilt option. The principle operative here is that a slight forward tilt of the seat surface rotates the spine forward, placing it in a posture close to that of the standing spine.[15] This accomplishes much the same function as the lumbar bulge in upright sitting with the added benefit that the operator is rotated forward into a better operating posture with respect to both the hands and the eyes. A disadvantage with this posture is that extra pressure is put on the legs and with that the nature of the seat fabric is very important; otherwise the operator will have a tendency to slide forward.

There are clear advantages and disadvantages to all three seated postures. The most reasonable recommendation, given the present state of the art, is to obtain a chair that allows the operator to move between all three positions. Thus, the operator might use the forward tilt for a time while keying in material from a Library of Congress card, then switch to backward tilt while calling up files from a database (a task which requires much less keying or reliance on hard copy). This flexibility has homeostatic advantages as well in that the operator spends much less time in any one fixed position.

Summary: Integration of Ergonomic Chair and Work Surface

The chair cannot be considered independently of the work surface. The system functions to support the individual by getting the elbow, arm, and head into proper operating position It is difficult to do this unless there is adjustability of work surface and flexibility of screen and computer. This is a fairly new concept. There have been somewhat adjustable chairs for a number of years. However, prior to the gas cylinder, true flexibility in chair adjustment was, for all intents and purposes, ignored. However, the notion that the work surface should be adjustable did not seem to occur to many people in the office environment. (The medical community, of course, has always required adjustable operating tables; dentists and barbers have adjustable chairs.)

This situation has recently changed. It is now possible to purchase a variety of split-level tables that allow one simultaneously and independently to adjust the work surface containing the keyboard and the work surface containing the terminal. The requirements for work surfaces to be adjustable relate to the criteria already discussed. That is, even if the chair is adjustable, it will be virtually impossible to fit a range of people of different sizes and shapes with only a single-height table. Some people are going to be extremely uncomfortable, most people will be moderately uncomfortable. This is made worse if the keyboard is not detachable from the screen. It is virtually impossible to get into anything like an optimal posture if the keyboard and screen are a single unit. Even with an adjustable table, where an office worker may be able to get the keyboard to a point where it is at a proper level (with arms either flat or angled upright slightly), the screen will then be so low that the worker will have to bend his or her head down considerably.

Other design considerations relate to the requirement of having to alternate between a screen that is nearly vertical and copy that is flat on the table. A copy holder that allows paper copy to be in the same plane and at the same distance to the screen from the eyes will alleviate additional strain. Finally, the importance of a flat wrist angle may require the wrist palm rest described earlier.

It might be pointed out that the ideal workstation is really most appropriate for what is called the "dedicated" operator. This is the person that spends several hours at one time at a terminal. These considerations become successively less important if terminals are to be used briefly. In a library system, for example, with an online card catalog to be used by a population of short-term patrons, most of the considerations that have been talked about are somewhat less important. However, factors such as angle of view and copy holder still are concerns. There must be space for people to write down the information they have just retrieved. These are obvious considerations, but they are often neglected by designers.

My favorite example of designer neglect has to do with the credit-card telephones that are in all of the airports these days. These are the phones with the little video display screens on them. They are examples of high technology at its best. However, if you have ever tried to look up a number in the phone books attached to one of these stations, you will have found that it is virtually impossible to take the phone book out of its little rack underneath the telephone, slide it out, and rotate it upward as it's supposed to be, without knocking the phone off the hook. It is a minor annoyance, but it indicates a failure of ergonomic systems design.

Visual Factors

Mechanisms of Visual Function

The initial flurry of complaints regarding VDTs had to do primarily with visual demand and eyestrain.[16] Two basic visual functions that must be considered in any discussion of visual work are focusing and adaptation.

With regard to focusing, the conventional wisdom is that the eye is like a camera. That analogy can be very misleading at times, but for our purposes we could agree that our eye is like a camera in the sense that it has a lens system which changes its focal length in order to keep objects clear rather than blurry. If you look at text on a piece of paper and move your hand back and forth while attempting to read the text, you can actually feel the muscles of the eye changing. Increasing or decreasing the tension on the lens muscle causes the lens either to stretch out or collapse. In technical vocabulary this is called *accommodation*, and it is part of what happens when the eye works to keep an object in focus. When objects are moved closer to the eyes, at some point the object will appear blurry. This is called the *near point.* As people age, the near point starts getting so near, until they reach the point where, as the joke has it, you can't read your newspaper anymore because your arms aren't long enough. This condition is called ***presbyopia,*** and it is a normal result of aging. Almost everyone who has reached the magic age of forty-three and onward needs reading glasses to correct for this movement away of the near point. Some people need glasses called bifocals in which a special reading correction is typically placed at the bottom of spectacles used normally for distance viewing. However, reading corrections are made to compensate for the postures used in ordinary reading, and these corrections are inappropriately placed with regard to postures used in viewing the VDT screen. This point illustrates the close connection between visual and postural concerns.

A more direct problem potentially related to accommodation concerns the way in which most VDTs generate their textual characters. On many display screens, particularly those that are less expensive, characters are made up of patterns of dots—the "dot matrix." These dots can typically be seen as individual elements with a low-power magnifying lens or even with the naked eye. The result is that dot-matrix characters may appear blurrier than characters seen in conventional paper copy printing. An increase in blurriness means that the eyes' accommodation system is working harder. This additional work may be related to eyestrain, although it has not been conclusively demonstrated. Morover, if the display is out of focus or the screen is covered with dirt, the problem is made worse.

Accommodation is not all that is involved. As eye focus shifts from far to near, or near to far, the two eyes work together—either converging or diverging. In addition, the pupil diameter is systematically changing. This simultaneous three-way interaction is probably related to visual fatigue. Exactly how, however, is not known.[17]

A second function is *adaptation.* As an example of adaptation, picture being out of doors on a bright, winter, sunlit day; the snow is covering the ground, it is high noon and there is not a cloud in the sky. Then, because it is too cold to be outside, you decide to go to a matinee. You walk into the theater, but the movie has already started. Your ability to see suddenly drops, and unless somebody is there with a flashlight, you cannot even see where the seats are. After a few minutes, though, the eyes "get used to the dark" and you can make out, with some degree of clarity, the rows of seats and people. This phenomenon is called *adaptation,* and it refers to the automatic adjusting of the light-sensitive cells in the retina to the prevailing level of illumination. Engineers call this an automatic gain control system.

Adaptation is, of course, bidirectional. You leave the theater after two hours and walk outside again. It is still bright although the sun is not exactly overhead, and you really cannot see. In fact, it is almost painful to keep your eyes open. Here again it takes time, in this case a few seconds, to let your system readjust itself to the prevailing level of illumination.

These examples of adaptation are actually rather extreme, occurring over several seconds or minutes. However, we also have the ability to carry out adaptation over what we might call *microtime*. One example of this is when the sun moves across the clouds briefly. The overall light level changes and our sensitivity changes with it, but we are barely aware of it. A more interesting example is the case of blinking which occurs very quickly. One hypothesis is that the function of blinking is to give little rest breaks to the retina by periodically lowering the amount of light that gets in. One authority has called these the windshield wipers of the eye.[18]

Adaptation over microtime becomes very crucial in consideration of the lighting and glare. We all know intuitively what glare is; it is basically unwanted light. Glare is to the visual system what noise is to hearing. In the case of the video display terminals, a good example of glare might be the very frequent situation where the screen is facing the window and the terminal is located between two banks of windows. This produces a double whammy. Since the operator is sitting with head erect, she/he is likely to be looking directly at a window. If the outside is sunlit, the light levels at that window may be something like three to four hundred times greater than the light level on the screen itself. At the same time, remember that all VDTs contain a glass faceplate over the display surface. Now, what is the definition of a mirror? A mirror is a piece of glass against a dark background. Therefore, by definition, most VDTs also act as mirrors. As a result, anything behind the mirror, in its direct optical pathway, is reflected in the mirror. So, if there is a second window or a row of overhead lights behind the screen, these objects are reflected in the screen. The result is that these images are, in a sense, competing with the character display.

Two things are going on here. First, assuming the operator is moving his or her eyes from screen to copy, those eyes are required to change adaptation rapidly from the paper copy, which consists of dark characters on a light background, to the screen, which is (typically) light characters on a dark background. However, the overhead lighting is an additional light source and it is very bright when compared with the VDT light, to which the focusing mechanisms of the eye must *also* respond.

Now, add to this the problem of reflected glare. By covering the screen face with an overall high level of illumination, the characters on the screen face are made difficult to read. This occurs because the contrast—that is, the difference in illumination between characters and background—is decreased.

Contrast is the basic optical characteristic that determines the visibility of an object as compared to its background. With print, for example, letters seen on an eighth or ninth carbon copy have an exceptionally poor contrast in the sense that the characters are "washed out" with respect to the background. The same thing happens when what is illuminated on the screen is covered with reflected glare. Therefore, as discussed before, the eyes' focusing mechanism is required to work harder.

Ergonomic Factors in Lighting and Glare Control

What is called visual fatigue or eyestrain is most likely a combination of excessive demand on the focusing and adaptational systems. I say "most likely" because although visual fatigue has been intensively studied for more than fifty years, physiological criteria of visual fatigue or eyestrain have yet to be defined.[19] Visual fatigue certainly exists as a subjective set of complaints or symptoms. Moreover, the factors just described are likely causes of this subjective state since, if these factors are improved, the symptoms are less likely to occur.

The next question is how to reduce eyestrain. Solutions are conceptually simple but sometimes complicated in practice. There must be sufficient illumination provided so that any paper copy can be easily read while at the same time avoiding large differences in illumination within the operator's field of view and also avoiding light sources that produce glare. Three factors complicate these requirements.

1. Unlike reading, the operator typically sits at the VDT with the head upright. Accordingly, the visual field of view is much more likely to include overhead light sources and windows. Thus there are many more potential glare sources in the visual environment of the VDT operator than has been true in the past when the predominant visual task involved bending the neck downward.
2. The mirror-like quality of the VDT presents additional glare control problems not seen previously.
3. The majority of VDTs now contain light characters on a dark background. This is exactly the opposite of paper text. Thus, there is an inherent difference in light levels moving from copy to screen even if all other factors are accounted for.

With sufficient funds and efforts all of these problems can be controlled. Creative light sources and fixtures can be used in combination to provide the required amounts of illumination. For some offices task lighting may be appropriate—i.e., small lights located at the workstation that illuminate only the copy. This is an old-fashioned approach that many designers object to because it tends to be messy. An additional problem of task lighting is that if there are rows of terminals, one operator's "task light" is another's glare source.

There are a number of ways glare sources can be minimized depending on the architecture and spatial orientation of the screens in the office environment. The problem is that most spaces in which many VDTs are now used were not designed with VDTs in mind. To solve this problem, there are simple and complex (i.e., expensive) solutions. Some simple solutions involve moving terminals around, reorienting them to avoid glare sources, hanging light barriers in front of offending light sources, and using curtains over windows. However, there are other human needs as well. Completely blocking out a window is definitely not recommended. Transparent screens or blinds on the market can give visual access to the outside while cutting down on glare.

Finally, there are various filters that reduce reflections on the screen face. Filters vary in price, but typically those that are very inexpensive tend to be counterproductive, causing more harm (by degrading contrast) than good. Although the final data on effectiveness are not in, I personally find useful either circular polarizers or micromesh filters. The best solution is to obtain samples and try them out. (This basic principle should also be applied to everything else I have said in this paper. There are not enough professional ergonomists to go around! Most will have to do ergonomic analysis on their own.)

Summary and Overview of Other Issues

There are many other ergonomic issues to be considered in the design of an efficient and comfortable interface between human and computer. This paper has ignored keyboard layout, key configuration, character format and design, screen format and design, mode of interaction (menu, command, joystick, mouse), program structure, ease of use, adequacy of reference materials (help commands), training, supervision by machine, monitoring by machine. To do all of these topics justice would require a book, not a short article.[20]

This review has attempted to focus on those ergonomic issues that seem to be health-related. Attention to details of ergonomic design will pay dividends in terms of increased operator performance and in terms of increased quality of work life. Ergonomic design considerations have "paid off" in office automation, and ergonomic design will certainly pay off in the special case of library systems.

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MARGARET MYERS
Director
Office for Library Personnel Resources
American Library Association

Personnel Considerations in Library Automation

Introduction

The clinic's theme, "Human Aspects of Library Automation," implies that personnel considerations will be addressed throughout the conference. Other speakers have addressed and will be discussing certain personnel aspects—e.g., fear and resistance, ergonomics, training, and staff involvement. Earlier clinics have addressed personnel topics also, particularly the 1983 clinic on professional competencies.[1] This paper will expand on some of these topics and address the impact of technology on library personnel in the context of traditional areas of human resource management.

Personnel issues can be viewed in two ways—from that of the employer or employee. Sometimes these viewpoints are divergent, sometimes in harmony. Administrators tend to be concerned more with organizational structure, work flow, personnel costs, and productivity. Workers are concerned more with questions such as, "Will I lose my job because of automation? Will I be reclassified? Will I be paid more? What effect will this have on my health? Will I feel less valued, dehumanized because of machines?" I hope to address both sides.

In preparation for this presentation, I reviewed the literature, talked to a number of people, and conducted an informal survey of approximately thirty selected library personnel officers and administrators. It appears that human aspects of automation are beginning to be looked at more closely in the library world. Unfortunately, this is sometimes in hindsight or when specific problems surface—not always during preliminary planning for introduction of automation into the library.

Some aspects have been explored in the library and information science literature but others have not been addressed to any extent. In the

March 1985 *Information Technology & Libraries*, John Olsgaard has an excellent literature review of library automation as a socio-organizational agent of change. He states that the library and information science literature still concentrates on the technological ramifications of various systems. While some progress has been made into the organizational problems of library automation, little attention has been given to the human concerns. Olsgaard suggests that the introduction of computer-based information systems in an organization or literature of the discipline affected follows a linear progression. First come problems concerning primarily technological or physical considerations, then organizational considerations, and finally behavioral aspects of computerization.[2]

In the world of library automation and personnel issues, there appear to be some trends but also contradictory things happening. The library workplace is certainly still in transition, still changing. To some librarians who began automating in the 1960s, computers are "old hat" but some are just beginning to automate. Even in libraries which have been in the automation business for awhile, however, personnel issues are still evolving. It appears that in some workplaces, automation creates stress and negative reactions. With others it brings excitement and enhanced feelings of job enrichment and achievement.

Change caused by technology is not the only factor that has an impact on personnel. There are a large number of social, economic, political, legal, and regulatory factors, both external and internal, that affect personnel in libraries. Sometimes it is difficult to sort out the issues since they often intertwine. Some personnel problems may be attributed to the introduction of automation in libraries but, in fact, the personnel problems develop because there are simply no clear, written basic personnel policies and procedures when automation begins. Adding a layer of issues related to automation on top of poor or ill-defined personnel practices or unresolved staff problems can cause chaos. Automation will not suddenly change a department with serious morale problems or inefficient work flow into a well organized unit.

Let us address some of the specific personnel functions, namely, organizational/staffing patterns, job design, position classification, selection and training, performance evaluation, working conditions, staff welfare, management/labor relationships, and professionalism issues.

Organizational/Staffing Patterns

In writing on the impact of automation on library organizational structure, most everyone mentions "blurring" of the distinction between technical and public services and questions the traditional separation of these functions. The argument is that units have been organized traditionally around different physical files (such as cataloging, acquisition, serials check-in). As a single, integrated online system becomes possible and one online authority file eliminates the need for multiple paper files, anyone can tap into these files if a terminal is available. There is less need for the more rigid divisions as these functions can be integrated.

The new Association of Research Libraries (ARL) SPEC Kit on *Automation and Reorganization of Technical and Public Services* speaks to this issue. Interestingly enough, however, of the eighty-two respondents to a survey, forty-six indicated that they are currently organized along traditional technical/public service lines. Thirty-six report some integration but none indicates complete integration. The introduction or movement toward integrated systems was ranked first as a possible factor contributing to organizational change but other automation-related activities did not receive high rankings. Changes in administration ranked second followed by need for improved staff performance, introduction of online catalogs, economic factors, and increased emphasis on service to users.

The conclusion of the survey is that although some experimentation with modifications to the traditional organizational structures has occurred, libraries seem reluctant to make significant changes to these structures. More information is required with respect to how change comes about, who is involved in decision-making, how better use can be made of existing staff, and what measures can be used to determine the success of any reorganization.[3]

Even though formal changes may not have materialized, libraries are finding that communication has increased among the departments. For example, systems designers need to turn to reference librarians to learn about how users are dealing with new systems; public services librarians need to get more information from the technical services staff as reference librarians find that instructional work increased with teaching people to use machines.[4]

The ARL study did find some integration of staff through assignment of multiple roles, dual function positions, or job rotation (doing part public services/part technical services work).[5] A number of writers have alluded to the fact that technical service professionals are being deployed into public services. Gorman, in his ecumenical library model, suggests professionals should be defined by specific user groups (such as subject, age, or educational level) and carry out all aspects of professional work (such as selection, collection development, cataloging, reference, bibliographic instruction). In this model, the professionals are more decentralized while the clerical group is more centralized.[6]

Job Analysis, Design, Classification

In the areas of job design/redesign, job analysis, position classification and job evaluation, there is change occurring in terms of job descriptions, professional/support staff roles, reclassification, etc. Introduction of automation is a good time to take a thorough look at all jobs. Administrators may wish to conduct a full-scale job analysis to describe systematically the exact nature of the duties and responsibilities of each job and the knowledge, skills, and abilities needed to perform successfully. If only a limited review is made of some positions, one might find demands from persons in other jobs for review of their positions relative to any jobs that have been reclassified because of automation. Administrators may feel it is difficult to determine in advance what will happen to jobs until the automated procedures have been in place for some time, however. In this case, an initial look can be made with the understanding that a more in-depth review should be made at a specific time later in the process.

The basic difficulty in job evaluation is definition of responsibility. In the literature and in talking to a number of librarians, one finds that the trend appears to be toward moving more responsibilities downward to paraprofessionals, particularly the more routine aspects previously performed by professionals. At the same time, however, other functions are moved upward as more planning, coordination, and specialized subject analysis is taking place at the professional level.

A number of libraries report fewer professionals and more paraprofessionals because of automation. Some report elimination of a few lower-level clerical positions. Some report they have hired new staff, particularly data processing department personnel, but also part-time hourly staff for circulation or temporary employees for retrospective conversion projects.

In the informal survey I conducted, some libraries had made no changes in position classification but had revised a number of job descriptions to reflect an automation component. These libraries considered automated activities as requiring new tools (i.e., terminal instead of typewriter) but no change in duties and responsibilities warranting reclassification.

A variety of libraries mentioned reclassifying library assistants to a higher level as they were given more authority to approve catalog production. One library reported changing a circulation/page supervisor from a paraprofessional to a professional Librarian I position on the basis of systemwide responsibility and supervision of more clerical staff. Others mentioned promotions of a senior clerk to EDP (electronic data processing) computer operator, a Librarian IV cataloger to a database manager, a secretary to head, word processing, and a management information specialist to senior management information specialist.

New positions resulting from introduction of automation included a professional authorities librarian position, and a new category of Library Assistant (LA) V as a training supervisor of LA IIIs and IVs in OCLC operations. A new training coordinator was mentioned by one library. Many libraries have hired a variety of computer and systems personnel such as senior data transcriber, EDP control clerk, computer operator, etc.

A problem in trying to reclassify positions may arise in libraries which are part of larger position classification systems such as city, campus, or corporation umbrella plans. As pointed out by Hugh Atkinson in the October 1984 *Library Journal,* civil service systems often are not responsive to changes. Direct supervision is usually the main path to advancement under civil service. Many librarian jobs that are changing with automation may mean increased administrative responsibilities (in the sense of planning, coordination, or financial management) but not necessarily an increased supervision load.[7]

Library administrators may find it necessary to spend more time educating city or campus officials (who have control over library classifications and salaries) on what library workers do. This has come about not only because of automation changes but because of other factors such as decreased emphasis on formal educational credentials. The increasing number of pay equity cases in librarianship depend heavily on librarians convincing the officials in their jurisdictions that library worker skills, effort, responsibilities, and working conditions justify salaries on a par with other occupations and professions with similar qualifications and duties. One librarian compared her typist/clerks using terminals with EDP operators in other city departments doing similar work. She found the library clerks were paid considerably less yet the work in other city departments was much more circumscribed. Atkinson states it is difficult to demonstrate to civil service analysts that the use of, acceptance of, and evaluation of cataloging data from an online utility is not the same as work done by data-entry clerks in a computer center who simply transcribe manual data into machine-readable data. There is more judgment used by the library workers in their work on the terminals.[8]

Besides the questioning of skills by outside agency personnel, the questions can come from internal staff as well. For example, as older workers are retrained, they may say, "I've learned a new skill. Why am I not paid more?" Younger, newer workers may be more apt to take computer skills for granted. In some word processing pools, support staff have found themselves downgraded since the jobs are more routine and they are not using other secretarial skills. Likewise, librarians who find themselves doing more specialized work—such as more original cataloging of specialized materials in foreign languages—may question if they should not be reclassified upward.

Professional/Support Staff Roles

Professional/support staff roles and relationships come under closer scrutiny with the introduction of automation. Generally, support staff are involved with more verification of bibliographic data in technical services and participate more in the first line of reference/information work in the public services area. As pointed out by Allen Veaner, some professionals are reluctant to give up former duties to support staff and support staff become restive, perceiving they are doing the same work as librarians.[9] When I spoke in summer 1984 at a meeting of the Council on Library/Media Technicians, this was evident when LTAs (Library Technical Assistants) stated they were taking on increased responsibilities but this was not always recognized by professionals or administrators.

LTAs depend on librarians for the definition of their roles. At the moment it is an evolving one. At ALA we still get requests for a booklet published in 1948 on professional and nonprofessional duties even though it is out-of-print. Few publications since that time have adequately addressed the distinction. The 1974 book, *Personnel Utilization in Libraries,* defined professional, technical, and clerical duties, but these need to be looked at again in light of automation changes.[10] However, as Veaner has stated, we need to abandon any static concept of librarianship as a fixed body of knowledge with preconceived distribution of tasks, duties, and responsibilities, since librarianship is an evolving profession and must continue to evolve.[11]

Library administrators need to look carefully at jobs, particularly at the time of a vacancy and prior to recruitment, as to whether a job which traditionally required the MLS can be carried out by someone without this education or whether the position is still truly a professional one. One library, for example, found that its interlibrary loan position no longer needed to depend on a professional person with extensive knowledge of collection strengths around the country. The duties could be handled by a paraprofessional with knowledge of how to manipulate the bibliographic network data.[12]

Another example of changing roles is in the reference department. As reference librarians find they need to spend more individualized time with users who request online database searches, they are assigning routine reference questions to paraprofessionals. With the advent of automation, library department or division heads often find they need to spend more time in coordination, training, and answering questions from staff in other divisions because of automation. These enlarged duties sometimes leave a gap in day-to-day operations. One library solved the problem by assigning a library assistant as clerical supervisor.

Although the trend seems to be on increasing responsibilities for LTAs, one librarian mentioned that the library reduced its LTA positions because LTA training instruction is failing to evolve to meet the changing needs of libraries in computer literacy. Another librarian felt that many technicians (i.e., LTAs) are better trained in technical aspects than most professionals. Many librarians have found that placing greater reliance on support staff as a result of library automation has helped do away with many repetitive routines formerly performed by professionals.

Competencies

Automation has an impact on the qualification requirements for library positions. Various studies of job vacancy announcements have shown that anywhere from 20 to 50 percent require some knowledge of automation or online searching skills. Many feel computer literacy is or will be as important to a librarian's success as reading and writing. Different levels of computer literacy are required for different jobs, however. These include: "computer literate" librarians who understand basic concepts and have some hands-on experience; "computer knowledgeable" librarians who use the knowledge extensively; and "computer professionals" who have responsibility for management of computer resources, teaching, designing, and decision-making relating to systems.[13]

Some argue that we need the same competencies as previously even though the tools may be different. For example, Nitecki argues that public services librarians still need to have communication skills, the ability to analyze information needs and retrieve needed data, and skills in instruction and management. What changes, she states, is a rising sense of accountability because of the costs calculated with each instance of use and the visibility of errors because of incorrect logic and improper selection of terms and files.[14] Most writers feel that managerial and communication competencies, planning/problem solving, and financial management abilities increasingly are required with automation. There is need for professionals to deal with more outside people such as vendors, electricians, and network people. Professional librarians in the automated work setting write performance specifications and work procedures, spend more time preparing and training staff, and concentrate on selling their programs. The change in emphasis can cause problems for people who find themselves less comfortable with these new duties. This may be one reason why there are more technical services job openings than applicants in recent years.

Automation sometimes requires more abstract thinking, but at the same time it requires adherence to standardized procedures and conformity. In my survey of librarians, one librarian mentioned that virtually all levels of the staff must have computer skills. To some extent this has had an equalizing effect on staff. One librarian mentioned that supervisors need to update their own technical skills even if they are not using these skills on the job. This is necessary to avoid a credibility gap where many staff are apt to be more expert than the supervisor regarding technical aspects.

Some librarians report increased emphasis on training, teaching, and interpreting skills; increased interpersonal skills; and the ability to cope with constant change. Those who cannot cope with change tend to leave, although one library said a shift from clerical duties to more substantive contributions had led to less turnover.

Some libraries require knowledge of specific database systems such as RLIN searching skills. It is important to think through, however, whether knowledge of a specific system needs to be a condition of employment prior to hiring or whether the skill can be learned fairly easily on the job.

Training

Although others will be addressing training during the conference, I did want to make a few observations. A UCLA study which looked at costs of 300 automation projects over a seven year cycle showed 10 percent of the costs was for hardware, 40 percent software, 50 percent for employee training, and 30 percent was for retraining and procedural updates.[15] Although these were not library projects, it is possible costs would be somewhat similar in libraries.

Almost all continuing education needs assessment surveys by library groups have found management and technology training as the highest priorities cited by librarians as desired continuing education topics. Perhaps this will shift somewhat as more graduates come out of library schools with computer backgrounds. There will always be a need for updating and retraining as new systems emerge, however.

The ARL SPEC Kit in *Staff Training for Automation* found few libraries doing formal needs assessment surveys before embarking on staff development in the automation area. There was no clear pattern of assignment of responsibilities for training—some libraries primarily used vendors, some sent staff outside to workshops, some assigned training responsibilities to a staff development committee or ad hoc task force, and some trained selected staff in-depth by the vendor and these staff in turn trained others.[16]

From my informal survey, I found the trend is toward more intensive, structured, formalized, and centralized staff training. Primarily this results from the need for increased standardization and accuracy because of national standards, as well as the national exposure of the individual library output. When I asked what changes libraries had made in staff training, one library administrator responded, "More! More! More!" Many also mentioned the need to develop a substantial body of procedural documentation and standardized written instructions to supplement vendor-supplied materials. The *Training and Development Journal* has on occasion mentioned dissatisfaction with computer-company training manuals because of lack of knowledge of concepts involved in adult education.

Several librarians mentioned that training for automation takes longer and that they had underestimated the time it would take staff to be comfortable and conversant with hardware and software. Administrators may expect proficiency more quickly than perhaps is feasible. One librarian reported the need for more cross training of staff to fulfill multiple functions. In addition, more extensive training in offline procedures was needed for those who were limited in the amount of online time that could be spent each day on the terminals. Another library has used the approach of thoroughly training a team of six persons from different branches; as each new branch came online, this team was assigned to be on duty during the initial weeks to help as needed.

Performance Monitoring and Evaluation

Training has as one of its goals improving the efficiency and effectiveness of staff. This brings us to the issues of performance monitoring and evaluation. There have been claims about automation improving efficiency, productivity, and worker satisfaction. There has been some evidence, however, that worker productivity can actually decrease when VDT (Visual Display Terminal) operations are coupled with speed-up expectations and strict monitoring by management. One librarian indicated in my survey that all staff learning the new automated system at one time provided the basis for comparison in performance evaluation. Another library, however, decided not to evaluate employees at the time of initial training in order to reduce the pressure experienced by employees. Many librarians reported they have made no changes in their method of performance evaluation, although some have added new criteria for reviewing performance—e.g., performance of the automated system, ability to train others.

Many reported that automation made it easier to have quantitative measures because the extent of available statistics is much greater than in the past. However, not all librarians use these data in establishing quantitative performance measures even though it is easier to do so. One librarian said a review of printouts was only done on a spot-check basis for new employees. One said it was difficult, however, to monitor work of data entry operators because it was immediately absorbed and could not be easily reviewed. Some commented that expectations have risen because of the greater scrutiny of each employee's work necessary with adherence to national standards. One mentioned that the increased quantitative reports made it possible to free up a supervisor's time to observe better the qualitative aspects of staff/patron communication.

It is important for administrators to recognize that staff may feel more pressure and uncertainty over performance evaluation during changes to automated procedures. It becomes more important than ever to establish clear expectations in advance so they are understood by staff and do not come as a surprise at performance appraisal time.

Working Environment

Many changes have occurred in the working environment due to automation. There is a large body of literature on the relationship between humans and tasks, equipment, and environment. It is just beginning to be reflected in the library literature, however, as library staff and administrators become more aware of the health and safety aspects of VDT workplaces. Use of visual display terminals is a controversial topic. Some in the computer, scientific community insist that this VDT use is harmless. There are increased efforts, however, by many women's groups and white-collar unions to influence legislation on VDT use and to push for more research on the relationship between VDT work and health problems. Insurance companies are beginning to get worker's compensation claims from office workers because of problems caused by VDT work. In June 1985, the National Institute for Occupational Safety and Health started a study of reproductive hazards associated with VDT use. This is pushed by 9 to 5, the National Association of Working Women. The Service Employees International Union (SEIU) and 9 to 5 are pushing for a model state VDT Information and Training Act which would require all employers to provide VDT workers with information on equipment and job changes resulting from automation. It would also mandate health and safety training, eye exams, transfers for pregnant women, attention to ergonomic guidelines for equipment, and rest breaks. There is legislation pending in over fourteen states.[17]

During National Secretaries Week in 1985, 9 to 5 organized a contest in 100 cities to pick the best and worst employers on how they introduced and used office technology. These were named the "online" employers and the "out-of-line" employers. (An example of an "out-of-line" employer is one who fired a worker via her VDT screen and another who wrote "You're stupid" on the screen!)

Library employers need to take steps to ensure that operator health issues are addressed, or morale problems may result in turnover, absenteeism, and lowered productivity. The National Institute of Occupational Safety and Health recommends a fifteen-minute break after one hour of high-demand work load and fifteen minutes after two hours of moderate work load.[18]

My informal survey showed a number of libraries have policies that limit workers to two hours at a stretch on the terminal, and no more than four or five hours per day at a VDT. One even had breaks after 15 minutes of continuous work on the CRT (cathode ray terminal). Several mentioned policies honoring requests for transfers away from terminal work by pregnant women. One reported a pay-grade increase for workers exposed to CRTs for a certain number of hours. This was not because of the increased skills but a recognition of more hazardous working conditions.

Many librarians reported changes in working hours because of the flexibility needed in scheduling use of terminals and the need to make maximum use of the computer time. Some cited increased night and weekend work. One library accepted volunteers to work earlier or later in order to take advantage of decreased costs and better response time in off hours. One assigned shifts by seniority, although this caused trauma for some people. New people were required to work the 3 P.M. to midnight shift. Some libraries have computer-operator personnel around the clock.

A number of librarians cited the need to make changes in seating and lighting, to improve the airflow, and to add screen shields. Several mentioned staff study committees to develop recommendations for further interior design changes due to automation. One administrator commented that the ergonomics aspects were not planned as systematically as they should have been. Obviously, changes in equipment after purchase make automation projects more costly.

Automation can result in the enhancement of jobs through job rotation and assignment of a variety of tasks or can lead to more routinization, less control, less variety, and fewer social contacts. Initially, one librarian found support staff had a variety of duties because they were running both manual and machine systems. As less variety occurred when procedures became more mechanized, there was growing absenteeism and discontent. This has been resolved to some extent by cross-training the circulation and cataloging staff so they can rotate public contact with machine tasks.

Quality of work life is now discussed frequently in the personnel and business literature. One example is a National Science Foundation study which showed that only about 20 percent of the price advantage by Japanese automakers was due to advanced use of industrial robotics. Eighty percent was attributed to superior management and collaborative management/worker relationships such as incentive pay, job enrichment, decentralized decision-making, and quality circles.[19]

Technology has been described as having the potential to radically alter centralized workplace arrangements, creating a high level of desire for *flexplace* arrangements as well as flextime. Many data transcription jobs are suitable for transfer to the home, so physically handicapped persons, older persons, or parents with small children can participate more readily in the workplace. The National Commission on Working Women, however, sees "telecommuting" or this most recent form of "homework"—linking home to office terminals—as a potential risk. Even though it might seem as a solution to barriers many persons face, working at home often has negative characteristics such as no benefits, advancement, or collective bargaining as well as few grievance procedures and worker isolation.[20] Some unions have gone on record as opposing this use of homework. I am not aware of librarians using staff in this manner, except for a few professional/managerial persons who may choose to spend some time at home on a terminal. But flexplace arrangements may be a possibility in the future for libraries as well.

Labor/Management Relationships

Automation has had an impact on a variety of labor/management relationships. Obviously, unions are most active when they perceive any movement toward reallocation of personnel and redefinition of work. There is always concern about layoffs. Some unions have asked for proof that negative employment consequences will not arise from computerization. Unions have issued model contract language concerning VDT use and checklists for negotiations related to health and safety protection. They have pushed for the right to negotiate classification specifications and wage rates for new or changed classifications resulting from automation.

In my survey of librarians, many reported there had been no changes in labor/management relations as a result of automation. Some mentioned union demands for limited time on VDTs and pregnancy transfer rights, plus involvement of union representatives on staff committees to assess further applications of automation. Some who anticipated union objections found these did not materialize. One administrator described the need to counsel and coach people who were unable to make the change to automation by helping them obtain lateral moves or even lower-level jobs where there was less stress. Peer counseling also was found effective in these cases.

Most librarians I have contacted have not experienced terminations because of automation but achieved reduction-in-force through normal attrition over a period of time. Librarians have relied on retraining to prepare staff for transfers or made appointments on a fixed-term basis to meet temporary needs. One librarian estimated a 5 percent personnel reduction due to automation in the last ten years. In one city, staff reductions are required for all city departments whenever a major task is automated. This creates serious staff resistance to further automation in the public library and less incentive for management to use automation effectively. The administrator said he was trying to change this attitude through education of city officials.

A 1980 survey of library personnel policies by Van Zant showed that in 900 libraries, only 261 had specific criteria or a plan for eliminating positions.[21] This points to a need for library administrators to develop written procedures for reductions-in-force. While robotics has not made an inroad in libraries as it has in manufacturing, there might be a future need to deal with this issue. Technology might make it feasible to use robots for shelving books, delivering materials, and even checking out books. A new ALA Library and Information Technology Association Committee on Emerging Technologies has this as one topic for future consideration.

Professionalism

I do not think we need fear robots will replace librarians. The increasing use of automation in libraries, however, has caused some discussion in the library literature and at conferences on the role of the librarian in the future. This is still a controversial topic. Lancaster predicts the librarian role will be enhanced to the extent that he/she can get out of the library and become part of a research team.[22] Nielsen and others have explored the online searching role of reference librarians. Some feel the increased visibility with patrons has enhanced the image and status of librarians, while others worry that the librarian's intermediary role in the future will be removed as more users perform their own searches.[23]

Certainly computer literacy skills combined with bibliographical skills have created an increased number of career opportunities outside of the traditional library setting. Several surveys show approximately 4 to 9 percent of librarians are moving into such positions, using their information skills in nonlibrary settings either as free-lance entrepreneurs or in other information management positions.[24] Perhaps librarians view the future depending on whether they are optimists or pessimists. As has been stated by others: "Automation is the pessimist's great fear and the optimist's great hope."[25]

Conclusion

In summary, librarians may wish to answer the following questions for their own organizations. Automation affords an excellent opportunity to review personnel policies and make them more formal, creating sound, workable, and clearly articulated procedures.

Have you looked at existing personnel policies prior to an automation project to determine if any of these might cause problems when a layer of automation is added? Have you reviewed job descriptions recently or at least on an annual basis and when a vacancy occurs? Have you reviewed performance evaluation criteria and communicated any changes due to automation assignments to library staff? Are you sensitive to staff fears about whether or not they may lose their jobs? Do you have a written policy on reduction-in-force? Have you conducted a needs assessment survey to determine what knowledge and skills are required prior to development of an automation training program? Have you developed policies on the amount of time workers should spend on the terminals or policies regarding pregnant workers and the use of VDTs? Have you studied and implemented ergonomically sound practices and made appropriate changes in seating, lighting, and equipment? Above all, do you have an overall human resources plan at the beginning of the automation program rather than one which is done in hindsight or as a result of emergency "firefighting"?

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JANE BURKE
Director NOTIS
Northwestern University Library

Automation Planning and Implementation: Library and Vendor Responsibilities

In this paper I will move through the various stages of automating, bringing in aspects of human relationships that seem appropriate. My remarks are intended for librarians who are well past the beginning and are in the serious stages of planning—i.e., either writing the RFP (request for proposal) or evaluating or awarding RFPs. Sara Fine provided a good theoretical background for understanding resistance to change and why it happens. I would like to make a few specific applications of Fine's theory to libraries and library staff.

Planning Process

Generally, there are two very distinct stages of automating a library. There is a planning stage and then there is an implementing stage, and within each stage there are substages. The first piece of the planning process requires constant reiteration while moving through the process; answering the question "Why automate at all?" Be careful not to answer that question on strictly a professional librarian level without involving the political environment, without involving the worker environment, and without really understanding the reasons why automation has been chosen. Many have realized that, even though as professionals we might be vitally interested in the automation of libraries and might feel that it is extremely important to the future of libraries, we are not at all sure that the rest of the world sees it that way. In involving others in automation or in planning it means first understanding the philosophical and economic reasons for automating.

I believe that if libraries do not automate they are going to go out of business. Everything I have seen in the recent past tells me that the information industry is moving toward library automation very quickly. If libraries are not prepared to offer automated services, the information industry is going to do that for them. Whether you agree or not, you need to understand the philosophical reasons for automating and to have agreement on them before you can begin to sell the idea of automation to the other people who have to be involved in it. There have been several statements that can be used in various political environments about whether or not to automate. Ron Zarzara, the president of DataPhase and a nonlibrarian, has captured the essence of why to choose automation in some of the recent DataPhase literature.

I would like to give an example of why it is important to understand one's reasons for automating. I work on a campus of 10,300 students, 30 percent of whom are graduate students, and with 3,000 faculty members. We receive calls daily from various faculty members who want to know why the entire collection is not automated. Northwestern University's libraries only have 60 percent or about 1 million titles in the database, and many faculty cannot understand why records on the rest of the collection are not online. So we have to have a grasp of the philosophical reasons as we explain why we have not, even after fifteen years, been able to get the entire collection online while reiterating the commitment to automation.

Another question to think about very carefully is: "*What* are we automating?" This is another area in which I would urge you to have a lot of discussion and to reach a firm consensus to be able to share the reasons behind the decision with others in a consistent fashion. Perhaps you have decided that you are going to automate only one portion of your library. There are very good reasons for doing that. Perhaps you have decided that you need to have an integrated system, and there are very good reasons for doing that. To gain staff support for the decision to automate you must present a clear rationale for what you are automating and why, and give the rationale at each stage of the automation process.

This detailed planning phase is often a good time to involve people outside of library management. This might be the point at which to bring in the campus registrar or the city data processing director, or whomever in the political environment will have a lot to say about this change within the library. One of the reactions to change is resistance to change from the external environment as well as the internal resistance Sara Fine discussed.

In answering these questions about why to automate and what to automate, it is not too early to begin tapping the external environment to see who reacts, who squeaks when you say "turnkey system," who has a negative reaction when you talk about getting rid of the card catalog.

Whom do you need to be concerned about as you try to make this change happen, not just within your library but in the rest of your environment?

Part of the planning process is getting educated. As soon as you decide it is time to begin educating some of the staff about library automation, it is time to enlarge your thinking and understand that you have to educate all of your staff.

Staff Involvement in Planning

Much of the resistance to change comes because we do not involve levels of staff early enough. Staff members are aware when things are going on among the management team or among the professional staff. We have not yet learned how to share that thinking early enough with paraprofessionals and clerical staff. It certainly might be too early to have them present an opinion about one system *v.* another system, but it is not too early to help the staff learn about automated library systems.

Despite Fine's identification of fear of breakdown of relationships as the primary reason for resistance to change, there is a real fear about losing jobs. Particularly because many library processes are so labor-intensive in a nonautomated situation, it is very easy to have that fear under the surface that "I really am going to lose my job." That plus the certainty that as soon as there is a terminal in the department the entire social structure is going to break down are the two reasons that library staff develop a resistance to change, a resistance to automation, and a resistance to technology. Much resistance can be overcome by involving the nonprofessional staff in the planning process and by keeping them involved.

It is very easy to view library automation as solely a professional activity. We can think it is one of the provinces of the MLS degree, that we are the ones who work at library automation. But remember that from the time you breathe the first word about automation, your clerical staff are convinced that their jobs will change.

When I started in library automation, part of my job as an implementor was to quiet the people who were saying out loud, "It's just a fad, it'll never work; it'll never stay; it will break down and they will cart it away and we'll go back to the comfortable old manual systems." Workers today know that they can't say that, but they still are frightened.

In deciding who first to involve in automation planning, pick very carefully. Do not necessarily pick the person who is easiest for the management team to get along with. Pick the ringleader. Pick the person who has the most influence among the paraprofessional and clerical staff. Pick the people who are the most respected by their peers and who, as they become convinced, can help convince others.

I remember a story about a company putting together a committee to implement a change. They went to pick the eight best people from the clerical level and all of them said "not me..." "I'm not going to be involved." "I'm not going to put myself on the line among my peers." "I'm not going to appear to have sold out to management." Although it might be easier to get the person who management can get along with, that person might not help the cause. So, even if it is tough to convince them, you want to pick the people who, as they become aware of what automation can really do for them, will provide the best help.

These issues about involvement and who should be involved are part of the planning process. However, they continue all the way through implementation.

As the planning process continues, it is time to go out to test the external environment. The issue that usually presents itself to test the external environment is getting the funding commitment.

There have been instances where the library wanted so desperately to automate that they proceeded to automate and they never told anybody they were going to spend a half million dollars on automation. They suddenly found themselves with five or six real bids and no money. In order to proceed smoothly, and in order for the change to be accepted by the library's external world, you need to get a funding commitment as early as you can. That certainly means some work on your part. It means being able to sell your city, your provost, registrar, or your county on spending money for automation for the library. Do it quickly. It will not be as difficult now as it once was. Acceptance will come easier simply because there are so many automated libraries now and because so many other processes are automated.

You will not know how your environment will react until you test it. You probably do not want to run over to the city treasurer and say, "OK. I need $500,000 tomorrow." You should build a case; take someone to lunch, have some informal conversations, and as painful as it is, you should probably have some of those conversations with the people you feel are your biggest opponents. Do not delude yourself into thinking that opponents' concerns are going to go away. The people you choose not to involve, because traditionally the library does not get along very well with them, are the same people who will come around and bite you just as you are trying to award that bid and get started. Save yourself a lot of disappointment and face up to what is sometimes an unpleasant task early enough to know who your friends are and to try and make some friends where you have not had them before.

The Data Processing Director

One of the traditional enemies—either in the city or on the campus—is the data processing director. We all know he has other views about what the world should look like and that he (I've never met a female DP director) sits over there buying bigger and bigger equipment. He gets all this money and no one knows how he does it.

I would like to plead the case of the data processing director. In today's environment, he is getting a little bit lonely. Microcomputers across your city or on your campus have taken away a lot of his traditional work load. Each department now has its own word processors, its Lotus 1-2-3 and its dBASE III software. They are doing all those little jobs themselves. It is possible that the data processing director is feeling a bit threatened. He is not quite sure what he is going to do to justify his next computer upgrade which he has to have to keep up his prestige with the computer vendor. You might be able to help him out—at least that may be the way he looks at it.

Once you have checked out the political environment and determined how to resolve the political questions, do not keep this information secret. Many of us view the political job as the job of the director. He or she will take care of that part, and all we have to do is stay in the library and write our hardware and software specifications. That is not true. The entire library staff is going to have to deal with the political structure outside the library. Share your understanding of the political environment so that when the circulation supervisor is accosted by a board member's wife, he or she knows how to react to questions about the library's automation plans.

Consortiums

Another decision along the way in the planning process involves who is going to come along on this automated venture. And here I'm speaking particularly of the question: "Do we join into a consortium, or do we automate on our own?"

Consortiums take a great deal of time. If you feel it is worthwhile for resource sharing purposes to automate with your neighbors, prepare to spend at least twice as much time as you would if you were on your own. It takes awhile to get everybody moving at the same rate.

In 1973, when I was working in a library, I was part of the first shared library automation system in the country. It actually drove me into analysis. We would sit there and discuss the messages on our overdue notices to the point where I went absolutely out of my mind. And there were only six of us! Nobody could agree! I talked to a counselor who reminded me that you can only retain consensus if you hold the group together meaning that the group can only move as quickly as its slowest member.

In a consortium, any dollars saved on equipment purchases will be spent in time. You will spend time in joint meetings about what the database should contain. You will spend time and money on travel. The opportunity for resource sharing is tremendous and worthwhile, but it is a different process when you are automating with someone else.

Flowcharts

One way to keep your task forces moving is to flowchart your existing manual work flows. Flowcharting can get a lot of lower-level staff involvement because they are the ones who know all of these steps. You do not know that they file into the green box as well as the blue box. If they put it down on paper, it will help in specifying the automated system, and it might even help to simplify the manual system in the meantime. Flowcharting is a good group process; it holds people together, and it makes people communicate at different levels in the departments.

Pictures

At this stage in the planning process, many of the library staff cannot picture what an online system even looks like. If they have never used OCLC they probably do not understand the benefit of having that title file online. They do not understand how nifty it is to pull up a record, change a field, and store it back in the database. Maybe this is a good time to get a vendor to come in and do a basic demo on automated library systems.

When I joined CLSI in 1974, I had never touched an automated system. I did not really become a believer in library automation until I was bringing my first library online. The day we were going to run the first overdue notices I thought, "It's not going to work." And when that first overdue started to print, I actually said out loud, "It works!" If I needed that kind of confidence, so do people working in your library. Give them a feeling of what it will be like before actually running the first overdue notices.

Locations

While planning, remember that the computer and the terminals have to go somewhere. Look very closely at your building. Figure out whose life you are going to disrupt and work with them. Do not drive someone out of an office by simply telling them it is going to be the computer room. Work through the space planning issues as carefully as you did writing your specifications, perhaps even more so. Anytime staff feel they will have to walk farther or do more work or be inconvenienced you are asking for trouble unless you involve them—i.e., inform them of the trade-offs. Once again, they probably do not understand that with the automated system they will not have to walk over to the shelflist.

Staffing

As you prepare to release the RFP, think about continuing-staffing needs for this automated system. Many libraries wait much too long to decide who is going to be in charge and what the staff organization will be. There are a number of questions: Who will be the person in overall charge of the project? Does that person exist on the staff now? If not, where can such a person be found? The answers are related to the decision whether to buy a supported software package, such as VTLS.

The people needed to maintain a turnkey system are different from the people needed for a supported software package. These differences affect budgeting and may require changes in the organizational structure as well as changing staff interactions. A supported software package with the hardware in the library might well require hiring a nonlibrarian systems staff. New personnel bring new kinds of personalities and also affect staff interactions.

In the organization chart the person called "systems librarian" should have interdivisional authority. The systems person has to be vested with both power and authority to implement the system across the library. Establish this responsibility and authority up front, before the system comes in the door. It is not easy to get consensus on this, and it takes a lot of work to determine to whom the person should report and how the power and authority are going to be underlined as well as who will announce the decision.

Vendors

Vendors are the other constituent in the planning process. After you've attended vendor demos and wandered around filling out cards at ALA, the vendors are aware that you are getting ready to automate. I think that you have the right at this stage to ask the vendors to help you in providing education. You also have the right to expect that they will respond to your specifications. But, vendors also have the right to refuse. While you are in the process of automating, the particular vendor might have twenty other bids sitting on the windowsill. There might be times when vendors simply are unable to do a demo on the exact day you would like.

As a profession, librarians tend to forget how small their vendors are in comparison to real-world companies. The largest firms in library automation—e.g., CLSI, Geac—probably sell $25 million a year in goods and services. Large by our standards, but not very large when you consider that IBM in 1984 sold $48 billion worth of equipment. That makes CLSI 1/2000th the size of IBM. The library vendors are companies that have hung in with the library market, and are trying very hard to stay in it. We may need to protect them a bit.

Release of Specifications

When the specifications are finished, it is time to touch base again with the environment. What is it that the purchasing agent has to have on page one? What are his rules and procedures? What has to happen for him to allow your document to go out representing your city or your college? Purchasing agents are constrained by their rules and procedures, and you need to understand what they are.

Once you are ready to put this RFP "on the street," form an evaluation team and keep the team in place. It is not easy to be on the evaluation team particularly in a consortium. It is natural that in evaluating multiple bids there will be some conflict on the team. Do some team-building exercises beforehand even if it means going out and hiring what you think is a "hokey" consultant to come in and do it. Get that group working as a team, because if you don't, the process may never come to completion. If the evaluation team breaks down the whole process may break down.

Changing Stages

As soon as the RFP hits the streets you move out of the courtship stage. You will be inundated by vendor contact. It may seem that it will go on forever with all the vendors calling and wanting to help you automate. Eventually, you will pick somebody and the rest of them will go away; it can be awfully disappointing if you have not prepared yourself for ending up with just one vendor. Even after making your selection I would urge you to remember that all of the vendors have invested a little bit in your system. It is disappointing for a vendor to compile a 300-page bid response and never get a letter saying to whom the business was awarded. We get caught up in implementation, and we forget that we have asked people to respond to us and that we should respond to them. This is one of the areas where I am representing the vendors and saying, "At least tell us who got your business." We keep track of how much business we get and how much we lose. If you don't want to justify your reasons, that's OK. At least send a letter indicating which system you selected.

Negotiation

Vendors are better trained at contract negotiations than you are. If they are any good they have done many more contracts than you have. This is not bad. It is just something to be aware of. It does not mean that the vendor will try to pull the wool over your eyes, but it does mean you ought to be prepared.

Understand that part of your obligation, as the customer, is to be the customer. Do not expect the vendor to sit at the negotiation table and represent you. Expect that the vendor has to represent the company. They cannot represent themselves and you at the same time. So have a person at the table who represents you. You might even read a couple of negotiation books as a team, and decide who will play good guy and who will play bad guy. This is the stage at which it is very easy to get sidetracked. Write down the big reasons you decided to automate and tape the list on the table. If you don't, some relatively minor software feature may cause you to lose track of the things you really want.

In contract negotiation it is important to start every session by saying out loud what the ground rules are for the session. Make it clear what the goal is for today, and find out if the vendor will tell you what his goal is. Does the vendor hope to get closure, or does he want simply to discuss one point or another?

Implementation

Once the contract has been negotiated we move into stage two which is the implementation process. It is much harder to implement a library system than it seems during the acquisition process. After going through writing specifications, getting them out to vendors, listening to vendors' responses, and seeing their demos, it would be pleasant to sit back and relax and "let the vendor do it." It's not that simple.

One of the first things to do is to ask the vendor to come in and set expectations with you. Every vendor has rules and procedures and ways in which they work with their customers. Vendors have developed these procedures from work in a number of installations, and it helps to have them sit down at the table and say, "This is how we work. This is what we're going to do, this is what you can expect us to do." Do this early, so your expectations and.the vendor's expectations will be aligned from the time that the first terminal comes in the door. The worst disappointments in library automation have been when the library expects one thing and the vendor expects something else and they have never talked about it. Be sure you have a very clear statement from the beginning about who is responsible for what. If the vendor said they were going to load the database does that mean that the vendor actually will change the tapes themselves? Probably not. It probably means the vendor will give you software to load the database. Is the library responsible for certain kinds of expenses such as coaxial cable or is the vendor responsible? The software function was a major part of the evaluation process. Now is the time to determine how that software function gets implemented.

At this point, the vendor probably has a priority different from the library's. The vendor wants to get paid. You need to keep in the back of your mind that the vendors really are in this for the money. There is no nice way to say this, but vendors need to take in money to pay their staff, their light bill, their stockholders, and to meet other expenses. The vendor is concerned about your implementation not only because you have a wonderful library, but also because you are a paying customer. Be sure to avoid disappointment by understanding exactly the payment terms stated in the contract. Sometimes I think we negotiate a contract and do not understand that when it says "within 30 days of invoice" it *means* within thirty days of invoice, not when the library's investment matures in 120 days.

After setting expectations with the library and the vendor, the library management team should present the results to library staff. It is easy for this to be another one of those points when the management team pulls into itself and announces to staff in a short memo, "We have selected XYZ's system."

Try to share with library staff the details of expectations and operating procedures as soon as you know them. Staff members are frightened as you begin to schedule training because they have no idea what it is. Does it mean fifty people sitting in a room with one person making them take notes? Does it mean that five people are going to work at a terminal? Does it mean the trainer is going to be there three weeks, two days, or never at all? Staff need to know what training is for and how it will work. Staff need time to picture for themselves what the training situation will involve. What is it going to be like to have an outside person judging their skills? If you have ever watched a training process, the very first person to sit down at the keyboard deserves a medal because he or she is always so frightened. There is an expert standing by saying, "Press the clear key" and the trainee cannot even find her or his hand much less the clear key.

Crisis

Expect a crisis. For example, the electrician has started to put electrical cable into the computer room and discovered there are no more circuits available or expect to put the air conditioner in and find there is no water line to get the water cooled or expect that the terminals are now going to come in June not in January. Expect that the director retires. But there will be some kind of crisis. If you are very well prepared you will have talked through how to react to a crisis earlier. If you have not prepared for a crisis (and most of us have not, as we want to believe that things are going to go well), then your first action in the crisis should be to gather the team together and talk it through.

Talk through how to respond and calm one another down. Try to look at this in a relative fashion. Just because one terminal arrived broken does not mean the entire process is going to fail. Put things in perspective. Everbody is edgy, and the crisis can either drive you right off the end of a loading dock or it can help you come back together with a little more sanity.

Keep up the involvement of the nonprofessional staff while installing the equipment. Usually you have a choice of types and styles of equipment. It is important that the people who will be laying their hands on this equipment be involved in the choices. Give staff some options, if you can, about terminals. Do they want color? Laser scanners? Left-handed keyboards *v.* right-handed keyboards? As you move toward getting the system implemented (because you promised the mayor it was going to be up for his birthday) it is easy to make these decisions unilaterally.

Remember that you are not the one who will be using the terminals regularly. We did an evaluation of color terminals at Northwestern, and I was surprised that not everybody likes color terminals. I love them, but a lot of the staff felt that color terminals did not add to their productivity at all. We would not have known that had we not put a terminal out and allowed staff to use it while we made equipment decisions.

Make this kind of decision as slowly as you can so you can get a lot of feedback. These are the people who can tell you whether you should put that electrical socket underneath or to the side because they know how they like to work. Give the staff a chance to think through their work flows as you set up the equipment. Do not select a date-due-slip printer if the staff absolutely hate the way it tears off paper. They will discover that the printer does not tear off paper properly and they will not get it fixed so it will never be used.

There is a tendency to believe you can have a very tight implementation schedule and to promise people in the library's political environment that you can keep to that tight schedule. This may work provided you are realistic. Do not expect more of your staff than is reasonably possible. Even though your vendor can load your file and get your terminals in and implement the system in thirty days, can your staff really be ready to go online in thirty days? The best strategy for announcing schedules is to have a fairly tight schedule internally—one that takes into consideration learning time and time to get started—but not to commit to that tight schedule outside the library until you are pretty sure it is going to come off.

Otherwise, you might find yourself driving the staff to keep the mayor happy when really what you need to do is add an extra month to the implementation schedule.

When you go online for circulation, watch out for something I call "online syndrome." Everybody is all shaky about circulation and the first day or so everybody is kind of spastic. As the first week goes along, people will get comfortable. They will learn that they really can get that book under that laser or they really can hold that light pen. But they are not really into circulation that first week. Staff are simply checking out books, and there is not much going on in the internals of the system. Staff get comfortable and they think to themselves, "Why, I understand this. I really can circulate books."

Then the system begins to do its job. It begins to make people delinquent, it charges fines, it sends overdue notices. It does all these things and the staff does not understand why. As much as you discuss "circulation parameters," the staff do not understand that 50 cents a day is coming from this parameter over here. Management needs to get involved at this point and hold the staff together because the staff are scared to death that they will never understand what is going on. This is the point at which they need a review on why all this is happening.

Postimplementation

Be careful of the postimplementation mentality. Once the staff gets those new work flows straightened out, they will never want to change them again. The resistance to change does not alter, whether it is a new automated procedure or simply the first automated procedure. This is the point at which the systems librarian comes in again with the authority to help staff work through changes to the automated procedures. Procedures have to mature as the system matures in the library.

Perhaps the best example I have is that Northwestern University Library went online for automated circulation in January of 1970. In 1985 we went online for circulation again with a brand-new circulation module and it was awful. Everything that had happened the first time happened again, if not worse. People were not any more comfortable with the new routines than they were fifteen years ago. The need for vigilance does not change just because the library has had automated systems before.

Summary

Automation brings with it a lot of change. It changes staff relationships, it changes staff involvement, and it changes the ways things are done. But it doesn't change the people. Planning for and implementing an automated system is best done while keeping in mind these changes and their implications for the people involved.

JUDITH A. DRESCHER
CHRISTOPHER SYED
BARBARA SHAW
STELLA BENTLEY

Panel Discussion: Reports on Staff Involvement in Library Automation

Editor's note: The following is an edited transcript of a panel discussion on staff involvement in library automation. The panelists are: Judith A. Drescher—now director of the Memphis and Shelby County Public Library and Information Center and former director of the Champaign (Illinois) Public Library and Information Center; Christopher Syed, supervisor of Education Services for North America, Library Systems Division, Geac Computers International; Barbara Shaw, Database Maintenance Assistant, Massachusetts Institute of Technology Libraries; and Stella Bentley, Planning and Budget Officer, Indiana University Libraries.

Drescher: Each of us on the panel represents very different points of view and each one has different experiences with automating libraries and involving staff. Barbara Shaw is an employee. She has observations about her present situation at MIT that others on the panel had not considered and really some of us had never heard. She wishes to bring these factors to your attention—i.e., what it is like if you are not fully in communication with the administration when you are working with an automation project. Chris Syed is going to discuss what a vendor can do, will do, and will not do for staff involvement and education. Stella Bentley tells us that the Indiana University Libraries are just finishing the planning for implementation of their automated system. They believe their plans are ready to go, and she will tell you what they are planning.

My function, after the others are finished, is to tell you a bit about the Champaign Public Library and Information Center automation project which has been in place for five years. I think I can then add to Stella Bentley's discussion by describing how Champaign planned and implemented, where we went right and wrong, and perhaps some specifics on what we wish we had done differently.

Syed: I should explain a little bit about my position with Geac. Basically, I am in charge of customer training for North America. The department is called education services and that is indicative of a change in the way we conduct training. At present, Geac has about eighty sites in North America, and there are five instructors to cover those sites. As you can well imagine, this means that we do not train every individual on staff. Geac's procedure has always been to train the trainers. This has implications for the libraries; the libraries select who will train the library staff.

I will discuss desirable qualifications for trainers. At Geac, we are revamping our methods of training according to recognized adult education standards. We are not working to be a bunch of computer experts trying to get the customer to appreciate an elegant system. Rather, we want to provide a tool whereby you can introduce a new system as a way of benefiting your employees. Our introductory package for library managers is designed to bolster your employees' confidence and the decision to go with a particular system. After the initial training we are available for consulting, and we assign an account representative (we call them project managers) for each site. This is perhaps a bit misleading in that the library probably calls its person a project manager as well, but the vendor's project manager is available for consulting and to clear up misconceptions.

I would like to switch to a slightly philosophical approach for a moment. We consider that we are involved in a technology transfer process, involving hardware, software, and knowledge and attitude formation. The hardware and software are not really the concern of the education department, and I do not think they require an explanation. However, knowledge and attitudes are a part of training. By knowledge, I mean that we have to impart to key members of the library staff the skills involved in running the system and some rules-of-thumb for applying these skills. As far as attitudes go, they become more important the further down the hierarchy you get. We have to instill confidence in these skills and confidence in the system. Organizational security is primarily a library responsibility in that the vendor cannot convince the data entry personnel that they are not going to lose their jobs. In certain ways, however, the vendor can give library employees confidence in themselves and in their knowledge of the system and thereby relieve some of the insecurity. So how do we involve people in training and confidence building?

In his book, *Automating Library Procedures: A Survivors' Handbook*, Ian Levy warns that you can err by introducing automation too abruptly and by guarding information. In other words, by keeping the plans secret, rumors start and these rumors are destructive to what we are trying to build. But involving staff is not an unmitigated good. You can involve people in wrong ways and at wrong times and you can involve them to the wrong degree. Selecting individuals to work on committees or activities should be based on their qualifications.

There are many ways of involving people: they can be on the implementation committee, they can be the project manager for the site, they can be part of the formal training process, they can be designated as internal resources for the staff. Staff can be involved in public relations—e.g., newsletters or current awareness for the public—which can have benefits outside the system in a political realm; as a resource person for actual users; and most importantly, in ongoing operations in the system.

When the system is installed, it may be according to the specifications the implementation committee agreed upon, but things are going to change. For instance, you may want different types of reports. On an even more basic level, we often forget that if you have a printer there has to be an operator there to put the paper in it. Your staff need to learn how to use the system. So there are qualifications involved with each of these types of duties and some, though by no means all, include individuals' communications skills.

Communications skills are especially important in staff training. Staff trainers also need technical knowledge, although it is not as important as communications skills or trainers' positions within the administrative hierarchy. I think the staff member with the nonthreatening personality type is the type of person you want involved. There is no reason for appointing department heads to implementation committees except perhaps as a committee as a whole. The actual working decision should be passed by a smaller group and then run by the larger group to make sure no objections occur.

Shaw: I am here as a staff member of a library that has OCLC and is just getting a local automated system. I will be trained to use the local system by the people Geac has trained at MIT, and I have never met anyone from Geac before today. About four hours a day I work on OCLC inputting cataloging; I spend the rest of the day filing and searching the catalog or typing—or any other activity that does not involve working online. This should give you an idea of my main concern when people talk about automation. It is not the problem of meeting it with fear but living with it day in and day out. After you have become familiar with it, it can be dull; and I think that is a big issue when discussing automation. Once resistance has been overcome, boredom is the biggest problem.

Working with cataloging is more interesting than straight data input because there are more judgment calls, you can learn about what you are doing, and you are not just transcribing information from page to terminal. Catalogers do make mistakes, and that is a relief because it gives us reason to pay attention and something to do about it. Along with cataloging there is the circulation system.

It has been my impression overall (certainly my feeling in talking to people in circulation at MIT) that there can be overkill in training. While no one where I work has been patronizing of the employees, there has been a sort of summer-camp, team-spirit attitude among some people of "Come on, let's go get that database." They are also accompanying it with a lot of drama and preparing us with "This is earthshaking." Really, my impression is that automating circulation will not be that disruptive, except for the one-time bar coding project. Most of the clerical staff have been working with online information on OCLC before. Yes, we need the system training; we need to know what is going on. Those things are very important and involve the clerical staff. At the very least inform the clerical staff of the decisions being made keeping in mind that you are not dealing with children. We may not be professional librarians, but we are adults.

There are several things that have been said here that I think are important. I am glad to have heard professionals discuss diversification of duties so that people are not online all day. Doing different duties provides an idea of what your work means in a broader context. Also, I appreciated the discussion of ergonomics. I cannot stress enough the importance of the placement of a workstation, the lighting, and the chairs. When you are online for hours on end, these are very important considerations.

MIT is fairly good at maintaining staff morale. There is no detailed monitoring of our work. We keep statistics, we decide our own priorities, we know what has to be done, and we decide when we are best suited to do it. Some people do not work well in the morning, some people come in at 7A.M., some at 11A.M. Leeway in little things like that may look insignificant, but it is important if you are dealing with work that has enormous potential for boredom. You may decide that one day you only want to deal with LC (Library of Congress) copy, or you may only want to deal with original cataloging, and really it does not matter to anyone else. People should be allowed at least to make the decisions that affect only themselves.

A problem with automation is that quantity is the only way to excel. When you are in a data entry position, if you want to be promoted or considered for another position, there is a limit to how high your quality can be. If it is really bad you will be fired, and if it is really good, that's nice, but it cannot get any better. All you can do is more work—you cannot necessarily do better work.

On the subject of the summer-camp, "let's go get 'em" attitude, I do want to say that MIT is doing some things that are very good regarding group involvement. One of them is that we have to bar code all the books we are going to circulate and there I believe the plan is to close the library and get all of the staff involved—professional and nonprofessional. That may be fun in air-conditioned buildings.

Bentley: I would like to describe the planning process we have gone through at the Indiana University Libraries. It brought us to the point where just a little over a month ago we signed a purchase agreement with a vendor for the software to begin to implement the system. So, I cannot always give a full evaluation on how well we planned and how well we involved the staff. The current planning effort really went on for about three and a half years, and there had been earlier efforts that did not result in any system being purchased. So the staff had some experiences with gearing up and even going so far as thinking they were ready to sign and nothing came of it. We had to overcome some feelings of "This place is never going to automate and the rest of the world is going way beyond where we are." An early goal was to involve the staff in planning and decision-making as much as possible and also to provide education for the staff. We were fully aware that some of our librarians and certainly most of our support staff had heard a lot about systems, but many of them had never seen one of those systems in action.

The initial thing we did was set up task forces—we had one on circulation, one on cataloging, and one on acquisitions—to investigate what they felt were the needs of the Indiana University Libraries for an automated system. I am talking about the Indiana University Libraries and automated systems—to serve eight campuses—and we involved people at all these campuses in the planning and decision-making. The system will be one central system to operate for all the campuses. They are spread around the state—Bloomington and Indianapolis being the core campuses—then six others as far as 200 miles away from the core campus. All will be operating from one central computer on the Bloomington campus. So in setting up these task forces both support and professional library staff from the various campuses were included. Travel is burdensome; we had many people spending hours in travel, let alone the time spent in committee meetings. Insofar as possible we tried to circulate documents. Whenever feasible we used teleconferencing with a statewide network for telephones and TV.

When these task force reports were completed and we had the committees' thoughts on the libraries' needs, we distributed drafts widely. Copies went to every department, and we gave people time to distribute them so everyone within the department had an opportunity to see the drafts. Then we set up a series of open forums where we could discuss these drafts. Usually the task force members themselves were in charge of the forum and not only did we have open discussions that people could come to, but this is one of the places where we used the statewide communications network so that people at the other sites around the state could listen to the discussion and ask questions with immediate answers rather than sending in a written question and waiting for an answer sometime later. As we finished with these discussions, naturally some questions arose that we felt required further investigation so a few more task forces were developed to look at specific problems—e.g., labeling and linking, how we would handle the patron file, what the conversion effort really was. We have approximately 5 million volumes and only 700,000 records that are in machine-readable form so we do have a massive conversion effort ahead of us.

Next we set up a series of vendor demonstrations. We were able to get each of the vendors to come in for at least two days so that we could have four or five separate sessions. These were for as many of our staff as possible, and we also invited key people from campus administration and personnel from both computing centers to see these demonstrations. They needed an opportunity to see what the systems could do, to ask questions, and generally to get a good idea of what was possible at that time. We also arranged for a site visit for some key members of the library staff, faculty, administrators, and people from the computing center. They made an 800-mile trip to see a system which was actually operating and had an online catalog and circulation system.

While we have had a lot of staff involvement, a few decisions, for a variety of reasons, probably did not filter down as well as they could have. The decision was made that we would use the computer at Bloomington that was part of the administrative computing center. Even now there are questions about why that decision was made, and that was one area where more information should have been made available to people. That decision greatly constrained the systems we could bring in. Even though we had rough drafts of our RFPs (requests for proposals) and had recirculated them throughout the library system, we abandoned the RFP process and actually entered into negotiations with a vendor.

Because we were going about the process a little differently from the classic RFP process, we had a whole new series of task forces that were created as we were negotiating with the vendor. Task forces looked at specific pieces of the purchase agreement. In many ways the purchase agreement was a joint effort—we wrote much of it and the vendor wrote much of it. There was a lot of discussion and compromises, and many of the compromises and suggestions came from the task forces that we had examining the document. Right now, as we are entering the implementation phase, again we have many task forces at work. They have representatives both of support and professional staff and people from the campuses. Again, that involvement is very important even though most of the books are on the Bloomington campus and most of the remaining books are in Indianapolis. People at the regional campuses have certain needs that must be expressed in the committee meetings, and we tried very hard to involve people from all levels of the library system.

In addition to circulating drafts of everything we did and having opportunities for people to express their concerns or interests, we also made an effort to include in the library's weekly newsletter at least a page on what is happening in the computerization effort. However, I recently learned that while we made enough copies for all librarians and support staff members to receive their own copies, some people are seeing it weeks and even months later. The copies really are not getting distributed. We are now looking at how to change the distribution system; we need to be much more concerned that the information is not only getting out but that it is getting out to all levels in the organization.

As we have reached the implementation stage we have created a team called the Preparation for IO Team. They have undertaken to inform people of what is going on and to let them know more about the system. We have had another round of demonstrations of the system and open discussions on each of the campuses. We are going to bring in a panel from another university that chose the same system a year ahead of us so that those people can tell our staff some of the problems and good things about the system and just how the implementation process has gone.

Drescher: At the Champaign Public Library and Information Center we have an online circulation system and an online patron access database through CLSI. We have been online in our circulation system for almost five years and with our public access terminals there has been complete database access for about a year. To prepare for this panel, I reviewed our experiences with the staff at our library. We found ourselves saying, "We don't remember that it was that bad." Then we went back and looked at the documentation and we remembered that it *was* that bad, but it had faded away and did not seem to be that difficult anymore. Automation has been readily accepted by our staff and our patrons for the most part. Our automation project has increased our ability to do library service so much better than we did before that it was all worth it. So for those of you who have been wondering, "Do I really want to do this?" I think we can offer you proof that it is indeed worth the effort.

We asked, "What do you remember that was the most difficult or the thing you wished you knew?" We decided one of the things we forgot to do most often and the people who got thanked rarely were our maintenance and building operations staff. For instance, our building is only six years old, and yet it was not wired for data cable. In order for us to go online we had a $10,000 wiring project that we did while operating the library. Circulation staff were standing at the circulation desk in the midst of electricians. Our building was not really designed very well for automation so we have power poles up and down the interior. Several library board members and patrons said, "You have this brand new building, it is beautifully done, and you are already ruining it." We also had to reconfigure our phone system. We had to find furniture. We have patron access terminals that need to be accessible to the handicapped, to adults, and to children. To do this we had to look for ways to modify the furniture or to sell furniture that is only four years old without making it look like we were selling furniture in order to have an automation project. We finally modified the furniture we had, but redesigning the interior configuration, plus redesigning furniture, plus wiring, plus phones, plus power poles all involved our maintenance and building operations people first. Involving staff should not be just at the administration and personnel level. There are staff at all levels who should be asked to contribute to the decisions that will directly affect how they do their jobs.

When the Champaign library decided to go online we did not have all the technology that is available today. We had nothing on tape, and it was determined the only way we could get our records online was by manual inputting of all the material. We hired thirty temporary personnel, brought them into a library that could not accommodate thirty extra people, put them in front of terminals, and handed them the shelflist and said "Do the best you can." Not six months after we got that project in full swing, Mini-MARC became available to our library. We then shifted to Mini-MARC which meant that everyone had to be retrained and the whole work flow in the technical services department was changed once again. We used Mini-MARC for about eight months when Innovative Interfaces announced their little black-box access between CLSI and OCLC. We were faced with reevaluating the work flow and retraining all those personnel to do the interface through OCLC and CLSI. All this happened within a time span of about eighteen months. The coping skills that those people acquired were enormous, and we all had terrific respect for them. One of the things that happened in this constant semicrisis and then changed was that people developed a sense of teamwork. We were no longer so much afraid of the next crisis (we knew there would be one) we just had not figured out what it would be. I think one of the best examples of a time when we thought we had reached our limit of patience was when all the power poles had been installed, and we were ready with our patron access project and found that our terminals were late in delivery. When they finally showed up we were ready to have a kind of open house on patron access and then discovered the electricians had forgotten to put the plugs in the poles.

As a public library, we had all kinds of materials that needed original cataloging—e.g., toys, video recorders, 16mm projectors. We found ourselves heavily involved in original cataloging that we had never anticipated. Our technical services department spent an enormous amount of time in reupping their skills in original cataloging to try to figure out a standard format for a puzzle and they did it. We share our standard formats with a lot of people now, but that was an implication of automation that we had not anticipated. We figured that we would use someone else's cataloging but we had too many things that were not typical of the average library so we had to do it ourselves.

One of the best examples I can give of how important it is to involve the staff at all levels is when we had to figure out a way to indicate which books were online so they would not come up again for inputting. We on the administrative staff had wonderful ideas about how someone could check them or open the back of the book and see if it were online. One of our shelvers had the solution, "just put a little star on the top of each book and then I could walk down the shelf and say, 'there's one without a star' and take it upstairs." So the entire shelving staff became the people who tried to find what was not online. It became almost a contest for them to find things that did not have blue stars.

We asked for two representatives from each department to help with the inputting. We insisted that the supervisor of each department be one of those two for a number of reasons. We wanted supervisors to have direct manual input into the database. Also, we wanted them to know which decisions were being made, how they were being made, why they were being made, and we wanted them to convey that back to their group. We also asked for another employee, in addition to the supervisor, from the department, so they came as a team. They were then responsible for conveying to their department what was being done and taking the department staff's concerns back to the people who were doing the inputting. It worked well in helping us to make the changes from the manual inputting, to Mini-MARC, to OCLC. We needed that direct line of communication with "You won't believe what they're doing upstairs again." The staff became much more aware that there were a lot of changes being done, but that people were involved in those changes.

So where did we go wrong? I'll tell you one good example of where we made a serious mistake. We had decided to put the bar code label and the date due slip on the back cover of the book. We did this with much discussion. We were told it would never work: the laser scanner couldn't read through the plastic; people would rip off the bar code labels; they would get marked up; and so forth. We could find very few other libraries that had done this, but we decided to take a chance. We went online with our circulation system and we sat back and waited to see what the public reaction would be.

Everybody thought it was fine. We had reregistered people four months in advance so that they all had new cards on the day we came up. We had some demonstrations. We had shown people how it was going to work. They were fascinated by the laser scanners. And for about three weeks we sat back saying, "Not bad." Then readers of paperbacks started throwing suggestions in the suggestion box. We had placed the bar code label and date due slip where readers couldn't read the paragraph on the back of the book to see if they had read it before. We had been preparing for some sort of computerphobia, and what we got was "Move the label." For paperbacks now, wherever the paragraphs appear, we put our labels in the least obtrusive spot. Our problem was in trying to be consistent for our circulation staff. The problem with the paperbacks is really the only serious complaint we had about coming up online with the circulation system.

We brought up our patron access system a year ago and that project brought in a whole new group of people. They were most often public service representatives, and we found hidden teachers on our staff who wanted to teach the public. We set up a task force that included a representative from each department to design an instruction sheet. We designed workshops and a script that each staff member could use so that each patron would get the same story and the same examples, and we involved all staff members. We even had the maintenance crew trained to be teachers. As time went on, some people said, "I really don't like to do this so much anymore," and we let them drop off. The people who liked doing the teaching the best were the technical services staff and the original inputters because they really owned a piece of the database. They enjoyed going downstairs and having someone find something on the screen, and they could say"I put that in there and they found it." The technical services people really enjoyed being part of that "public" project.

Almost by osmosis, people in the building and in the library system said, "I want to be involved." I didn't have the problem, over the long haul, of people saying "I don't want to do it." It certainly took some convincing but peer pressure really does work. If you get enough people saying, "I think this is a great idea," and if you can get them to understand that everyone is in this together and that we all own a piece of the database and want to teach the public, they really will want to do the kind of project that you're looking for. It does not work to say, "It will make your job easier," or "The public will like you better." Both of these are untrue.

We find now that we have a difficult time remembering whether we were tearing our hair out, or whether it didn't work, or what kind of nitty-gritty decisions we had to make. One piece of evidence we have is a Rolodex file of instructions and documentation rewritten by four staff members. They decided that they couldn't read the documentation and instructions, didn't like the format, and the information wasn't easily accessible because you had to keep flipping through the book. They put the instructions on Rolodex card files and placed them at all the service desks. It was not my idea. It was our head of circulation's idea. It works well, and when they gave it to me to bring to the clinic, I said, "Are you sure I don't have to bring it back?" They said, "No, that's okay, we don't need it anymore," but it was a wonderful crutch when they needed it.

I would like to begin the discussion by asking Barbara Shaw about a comment she made today. She said that one of the things that she rather resents about the automation is the loss of her supervisor. I had never heard that comment before and I would like to hear a little more about it.

Shaw: I don't think I'm unusually fond of my supervisor. He's very nice and he is one of those communicative people Chris mentioned. When I mentioned the loss of my supervisor I meant the loss of my supervisor to committee work. In our section we all enjoy whom we work for and whom we work with, which is important and one of the reasons I'm happy there.

About a year ago, committees started building, and while I don't think any one person served on all of them, it seemed like they did to us. There were people we wouldn't see all day for two or three days at a time. One way that people talk about involving staff in library automation is putting people on committees left and right, and there's got to be a limit to that. The larger the committee, the longer the meeting takes, because more people think they have something to say.

I don't know that it was unusual that we wanted our supervisor back, though there may be places that don't want their supervisors back. There was one good thing about losing my supervisor to the automation committees. I didn't get a whole lot of training on the system because my supervisor was too busy, so the person who had been there right before me trained me. This gave him an opportunity to do something new and different and fun and to try out his supervisory skills. Then there was a bit of a turnover in the staff, someone else came on behind me, and I trained him. It was fun. So the one good thing about losing your supervisor to committee work is that it diversifies your own duties and gives you a bit more responsibility.

Bentley: Given the number of committees and task forces we had going at Indiana, that certainly is a real cost of the process. We never stopped and figured it out, but it is a tremendous investment of personnel time at all levels. In our case there is not only the time they're in the meeting, but for many people there's a lot of travel time involved, too. Some of them are spending two hours on the road for every committee meeting that they had to attend. I don't think we would want to do it any other way because it is essential to get these people involved, but it is something you have to be aware of, that there are going to be things that you have been doing in your library that just can't be done or have to be done by other levels of staff in order to have this kind of involvement.

Drescher: Jane Burke said if you were going to be involved in a consortium that that would double the time spent, and our implementation involved forty-two other public libraries in a consortium. The investment of time and taking people away from their work probably is worth it, but it doesn't look like it. The reason that Barbara's comment struck me so much is because I had never considered that aspect at all. We hauled the desk people out of each department, put them on committees, and told them this was the priority of the library at the time. I wouldn't be surprised at all if there were people at the Champaign library who felt exactly the way she does. I wish I had known that before I started my automation project. I probably would have done it a little differently.

I wanted to ask Christopher a question about the vendor telling the library how to involve its staff. What do you tell a librarian who is ready to implement about whom to pick, and how to pick, and how many committees and task forces?

Syed: It's only in the last month or so that we have even heard the concern expressed by a library. We have negotiated in contract talks on how we as a vendor would help a library involve its staff.

There are many different ways and many different levels of involving people, and there are many good reasons for involving people. Their position within the hierarchy is one of those good reasons. But position may be more important on the policy committees—the decision-making committees. On the other types of committees, personality factors, communication skills, and that sort of thing should override the position within the hierarchy. No matter whom you assign to these committees, you are going to lose some talent from the work group and that is to be expected.

Shaw: What are some of the other means of staff involvement besides committee work?

Syed: One way that we haven't touched on is the public interface. Someone has to do newsletters and handouts for the public. Someone should be doing an internal newsletter to brief the staff on all the activities of the committees. There is the implementation committee and its subcommittees. It is not necessary for every department head to be present at every meeting of the implementation committee. People can serve as trainers.

Especially in a university library the so-called lowest level of staff are quite apt to be university graduates. That separates librarians from the nonprofessional staff by one to two years of library school. Staff at all levels have agile minds. The nonprofessional staff are trained in chemistry or physics or something; they are going to pick up on automation if you don't scare them off. Therefore a lot of the activities that we try to restrict professional librarians to can be delegated. The staff can feel confident about automation, thinking, "Oh, the night shift supervisor now knows how to run this computer; it can't be that difficult 'cause I worked with that guy all the time."

Bentley: We used a variety of methods to select people for committees. We had the administrative level from all the libraries recommend people. We had people volunteer. Sometimes if we got a task force or a committee together and realized that there was some level of work or library or constituency that was not represented, we either went out and solicited somebody or again looked at the list of people who said they were interested in serving on groups. If it was dealing with labeling and linking, the people who would be dealing with those tasks—in circulation or in the processing department—would be on the committee to make recommendations. These recommendations then are coming back to a sort of an implementation committee that consists primarily of administrators.

Drescher: We had a committee do something and then had it reviewed by a larger group. As we were readying our patron access process, a person on our library staff suggested that we really ought to check the real world to see how we were doing. We thought we had the best instruction sheet, the best script, and the best workshop we had ever seen, but we were the only ones who had seen them. So we had a kind of closed open house at our library for our families. We tried to train them on the touch and keyboard terminals. We used the sheets that we had designed (that were perfect) and we revised them the next day because there were some real problems. Mostly it was library lingo or we had made assumptions that they would understand the keyboard, and, especially for the touch terminals, our sheets were just bad. That gave us a chance to bring in children, young adults, elderly people, and middle-aged people. Our family members had a good time watching us trying to teach them, and they asked us all those questions that we either didn't think about or didn't know how to answer and had ignored. In particular, they all wanted to do subject searches, and we were desperately hoping they wouldn't want to. That kind of pretesting takes time and guts and it will probably ruin some plans that look so wonderful. In the end it makes for a much smoother transition.

Shaw: When our circulation staff was trained to use the circulation system, one of their concerns was that nobody can predict what a patron is going to ask about the system. Not only, "Can I get this piece of information or that piece of information?" but "What specifically can't be retrieved?"—e.g., a patron's history of overdue books. There was a list of bizarre questions people came up with and it was posted in the circulation department and patrons were invited to contribute to it anonymously. It is still up; it has become quite lengthy and is a very popular item.

Syed: There is also a tendency to worry that someone below you might possibly know more about an aspect of the system than you do. Management classes tell us that advancement should be because of administrative ability and not technical knowledge. We shouldn't fear that someone may know a little more about how to check out books than we do. And we shouldn't try to bog ourselves down trying to know everything. One thing that you learn very quickly in the computing business is that there is always a junior programmer who knows a heck of a lot more about systems than you do. Instead of being threatened by that, you should be proud to have such a person on the staff.

Drescher: What we had mentioned a while ago, too, was the idea that perhaps some training can become excessive. I didn't have that experience in our situation, but I was wondering if Chris Syed wanted to discuss whether Geac excessively trains people or whether you even considered that aspect.

Syed: I don't know that we can be accused of excessively training, but we have adopted two different approaches—one in Europe and the United Kingdom (where we offer individual, one-on-one instruction), and one in North America (where we have structured courses of rather limited duration). The problem is when the needs of the customer don't match the duration of the course and that can work in both ways. We can offer—as we did at MIT—ten days of circulation training; or on another site, we could offer four days of circulation training. Either of those could be too long or not long enough. It depends on the expectations at the site and the actual need to know of the people that are involved.

Question: After we went online, the circulation staff members who were trained found better opportunities in banks and other facilities—especially in that they weren't dealing with the public. How can we talk with managers or work with managers who have this constant turnover problem after people have been trained to use computers?

Syed: I don't know what you can do to minimize turnover, but one of the things that might help is to make sure that the stress factors involved are limited. To limit stress, make sure that the people who feel that their jobs are threatened, that they may have to acquire new skills, or that they may be moved are given the tools whereby they feel confident in their ability to work with the system. From personal experience working in a library, I remember how the woman who used to phone everyone and tell them that the books they had requested were available suddenly had all that printed up for her. She had to go off on an extended holiday to try to cope with the change.

Drescher: From a public library experience in this community (Urbana-Champaign), we have a very high turnover rate because we hire so many students, part-time students, or persons attached to a spouse at the university. We are used to the very high turnover rate, and our solution to the problem is to make our training as specific and easily done by our own in-house staff as possible. We don't try to prevent the turnover problem except by trying to make a pleasant workplace while they are here.

Shaw: In the large office I work in, which is cataloging and acquisitions, maybe 50 percent of the people have held the job that I now hold. There is evidently considerable upward mobility. One reason we all like our supervisor so much and do not want to lose him to committee work is that he enjoys training people. He prefers to hire people who are going to move on soon because he thinks they are fairly intelligent and because they are more fun to train. He then gets to train someone else when they leave.

Question: What role did the director play in the planning process?

Bentley: Our director has served as an ex officio member of the general planning group, both when I chaired that group the first two years and when we hired a systems officer who chairs that group now. In both cases we were reporting regularly to the director what the steps were and how we were proceeding with the planning. I would say, as with most things going on within the IU libraries, the director is generally overseeing it and giving it direction. She certainly has had a large role on the campus in both obtaining the funding—which we finally got this year—and providing a leadership role with the key faculty that have to be won over. (Some of them have already told us they want those cards there forever in the card catalog.) She is aware of and approving the planning and implementation within the library but she is not directly involved on a day-to-day basis.

Question: At any point did the director say, "No, I don't agree with that; we're going to do it some other way"? What was your reaction?

Bentley: We have a good working relationship with the director and we kept her informed through the steps. It's not as if something were well underway and then she said, "Don't do that." If she objected, it happened early on and we didn't have to undo something that we had spent a lot of time doing.

Comment: I have a comment on the effect of the first press release following the information that the library is going to be automated and the kinds of questions that patrons ask even of support staff who work with the public. The questions can be very specific, and unless the support staff knows exactly what's going on, it can grow very tiresome saying, "Oh, I don't know." It would be very useful at least to have something to tell patrons or to be able to say, "This is what we can tell you so far."

Question: I have a comment and then a question. The comment concerns the approach to training. At each of our libraries we have three training sessions. We train all staff then we expect them to build upon these training-sessions skills. But not all staff are entering data, so they have trouble keeping up with these skills. Their other duties do not seem to decrease any, and it is hard to find the time to practice on the terminals.

My question is about the committees that were used during the implementation process. Do any libraries continue these committees after the system is up or are they just disbanded. In other words is there evaluation or review—i.e., is this system doing what we thought or what we expected?

Drescher: We disbanded our committees in that they did not meet as actively as they had in the past but they do still exist. For instance, we recently revamped the instruction sheet for patron access based on the feedback we received over eight or ten months. The committee that was assigned to design the instruction sheet originally met again to do it over. So, at least for staff working on patron access, yes, we did keep the committee active. For our database circulation system, no, we did not keep the committees.

Question: To follow up on the earlier question, since IU has gone through such a large planning process I would be curious to know how long you think the committees are going to be functioning. Will they be involved in evaluating the success of the implementation?

Bentley: The implementation itself is going to be a very long process. While the software will be loaded later this month, our actual database load is not scheduled for almost a year. Even if everything should run according to the timetable, final acceptance is not even due until December 1986 so many of these task force groups will be very involved for the next year and a half and probably even longer given the type of process going on. We decided not to have a tight timetable that we knew we could not stick to. And we will probably create more task forces as we see needs for them.

Drescher: We had task forces or committees that went over the broad spectrum of library services. Now we have little committees in each department coping with more of the basic details of handling problems or having expectations that were not met or thinking we understood doing something one way and we didn't. I would say we are functioning with the circulation department as a committee meeting together and saying, "This workflow procedure does not work. How are we going to do this?"—then announcing the department's conclusions to the rest of the library system so we all understand what we are doing.

Comment: Whether or not the same committee exists after the implementation, some sort of monitoring or enhancement committee should exist to exploit the system once you have it. Also it seems that each library works on reformatting the instruction manual. Should librarians insist that vendors provide useful documentation so that library staff can work more efficiently or intelligently?

Drescher: I agree. However, one aspect of doing the revisions in-house is that the library can add its own equipment with its own specific instructions and locations. Documentation becomes more familiar to the staff when they read that they are going to be using the terminal on the small green desk right outside the door.

Question: I'm interested in the subject of monitoring. It seems that in a library that is doing a lot of its own data entry this could become quite an issue. Are there automated systems in libraries that have the built-in capacity to monitor data integrity, input errors, that sort of thing?

Syed: That is a rather touchy issue with me and has been used by unions in strike literature in the past. I think there are certainly checks on data integrity in our system and in other systems as well.

Shaw: I have never personally been monitored. Checking on the quality of the data entry at MIT has never really been possible until the cards come in from OCLC. When Geac comes up we can be checked at the end of the week. But it has, as far as I know, never been a significant problem. There are people who have been highly error-prone at MIT and they have either not been promoted or they have left. There is one problem that you mentioned. I had great trouble when I first started separating out the letter *l* and the *one*, because on the typewriters we used there was no *one*, we had to use the *l*. Then you go to the keyboard and have the *l*s and the *ones*. From our test load on Geac it became apparent that confusing the two characters is one of our problems and those are all going to have to be corrected manually. That comment leads to another, which is that we expect our automated systems are going to create at least one and possibly two more jobs. Nobody's talking about losing their jobs at MIT; we're looking for more people.

Question: Can you tell what positions will be created?

Shaw: I'm not sure what the titles will be, but they will primarily involve online editing. We expect to have a lot of problems when the system first comes up—errors we never knew we made.

Question: Are there others in the room that considered hiring a database manager or who hired a database manager once they came up?

Syed: Edit and verification jobs are created which may mean people are shifted or the work flow changes. It is encouraging to hear that automation is not resulting in a lack of jobs but perhaps in responsibility shifts although that can be just as stressful to the employee. For example, you need people from all different levels for building authority files; you need people who know about subject headings—professionals.

Drescher: As a public library director—and I think this holds for other public libraries—my needs are considerably different from those of academic libraries. I've heard a lot today about the authority files and original cataloging, but we buy almost 90 percent of our material preprocessed, and the only thing we're running through OCLC is anything our jobber will not do. So as soon as we were online and had the database established, we deleted a professional staff position—the cataloging position—by attrition. We also deleted two part-time clerical workers. Over the last five years we have lost nine FTE employees by attrition. I hear a lot of people say, "Now, you're not going to lose your job," and that's true in some cases. In our case no one lost a job because of automation: we had the luxury of waiting. We also had the semi-luxury of being in a community where turnover is high, so we knew that people were not going to be here for fifteen or twenty years. But as soon as we weren't typing 4000 overdue notices off of microfilm and manually filing all the little cards for reserves, and sending someone out to the shelves to find them, that was two FTE employees right there that we did not need. We found places to shift some people, but the old jobs with the manual systems just were not there anymore.

Comment: There are two things that people may need to remember. One is that the expectations of the patrons go way up when you get an automated system. If patrons find an error they expect the error to be taken care of that day. Libraries really need to have people trained and on board who can do that. The other thing to remember is that you will be maintaining copy, volume, and holdings information in the circulation portion of the systems that you may not have needed in a manual system When a patron asks about an item at the circulation desk, we want to have holdings information in the system for that copy or that volume. Both of those things—the ability to correct the database quickly and to keep up with holdings information—often necessitate some extra positions for database management. At the University of Illinois there is a professional who supervises both units, both the people who do the inputting are LTAs and library staff.

ANNE GILLILAND
Staff Archivist—Records Specialist
Archives and Rare Books Department
University of Cincinnati Library

Online Catalogs and Library Users

I want to begin by reading two letters to you which were published in the 1 April 1985 issue of *Time* magazine under the heading LIBRARY BYTES. The first letter, from Kenneth N. Sharpe of Peachtree City, Georgia, asked a question:

> I see a conspiracy in the public library. Advocates of computers convinced us that we should replace benign, inexpensive, non-energy consuming card catalogs with expensive, maintenance-requiring, energy-consuming terminals. This is progress?[1]

James A. Munn in Milwaukee writes with another opinion:

> Each time I work on a computer, I am amazed at the potential it has and the abundance of information I am able to retrieve. For the experienced user, the joy of a computer is in finding valuable information by surprise.[2]

These letters and others, were written in response to an article published 25 February 1985 by Philip Elmer-DeWitt entitled "Terminals Among the Stacks" which took a journalist's view of the use and availability of automated services and computers in public libraries, the New York Public Library in particular. The thrust of the article is clear, and here I quote the writer:

> The advent of the computerized library has also brought new problems. Computers have a way of making simple research tasks more difficult—for example, when a casual user needs computer instruction just to find a book. Even trained librarians say there is an art to performing an efficient data-base search; an awkwardly phrased query can quickly lead to information overload, generating hundreds of responses. At the same time, computers can be too efficient, eliminating what is called the serendipity factor....[3]

Time is not a journal which librarians read in their professional capacity as automation managers, but it is read as a reputable current-affairs magazine by many library users. I will leave you these questions to ponder while I go on with the paper—if the popular media are communicating similar misconceptions and confusions to the public and reinforcing myths and fears about computers, how are libraries counteracting these? How are they dealing with both the *myths* and the *realities* of providing online computer services to users?

Online catalogs have been in operation in the United States for more than five years, and it would seem to be an appropriate point to look at how these have been implemented, examining the importance to the user of certain intellectual and physical factors, and, on the basis of this, to make recommendations for consideration by library automation managers when developing or implementing online catalogs. My background and experience with automation is mainly with archives, but libraries experience similar budgetary constraints regarding the purchase of hardware and software for their automated systems and similar problems in defining user requirements from those systems. This paper, therefore, will discuss variables which should be considered in order to determine what is the most effective way to manage an online catalog and to produce something which is, at the same time, a "user-driven" system.

I will incorporate as illustrations some responses from a brief informal survey which I conducted in January and February 1985 of those libraries which participated in the study of online public access catalogs funded by the Council on Library Resources in 1982 (see appendix).[4] These responses represent about twenty-five public and academic institutions which are using a variety of online systems. The original surveys were done by OCLC, J.R. Matthews Inc., Library of Congress, Research Libraries Group, and University of California Division of Library Automation (DLA) Group. The aim of my study was to see what had been done with the online catalog in terms of how it serves the user: how the systems were being promoted and received and how they were operating and being used in 1985. I will also take some examples of use patterns as observed on the University of Illinois Library Circulation System (LCS), which is the online catalog with which I am most familiar.

In order to ascertain a measurement of effective use for the management of online catalogs, it is necessary first to come to some consensus on their function and role as defined in user terms, and to use this consensus to make some projections as to the future development of these facilities, without, if possible, getting bogged down in debates about "electronic libraries." The two most important design concepts of the online catalog are that it is evolutionary and dynamic, both physically and intellectually. It must respond perforce to hardware and to software development and also to the changes in user needs, demands, and education which arise from a changing social environment. It is not sufficient for librarians today, as it might once have been with the card catalog, to view the installation of an online public access catalog as a fixed physical presence to which records are added, modified, or deleted by catalogers. Library managers must specifically designate a head of automated or online services to oversee the management of the online catalog. This should be someone who is not necessarily a cataloging expert, but someone who has both library experience and qualifications in systems and systems analysis. I want to read to you an example of a job description for the post of Automation/Systems Librarian that was recently advertised in *American Libraries* because I think it expresses all the salient points:

> This person will have the responsibility for and work closely with the director on the planning, development, implementation, and management of automated systems in support of the libraries' functions and programs....Due to the general campus commitment to library automation, there is a local group of automation resource persons, including other systems analysts and programmers with expertise in library automation, with whom this person would work. The automation/systems librarian will be a resource person for other library staff and would work closely with them in needs analysis, problem solving, and systems design and maintenance. The person would also be responsible for training staff and some users in the use of the libraries' automated systems and for representing the library on various committees....This person should have an advanced degree in librarianship or computer science or both...as well as demonstrated skill and expertise in systems analysis and design, library automation, and written and oral communication.[5]

Richard DeGennaro was concerned that "we seem trapped into perpetuating the concepts of the card catalog in the online environment"[6] and I believe that this will continue to be true unless automated-systems personnel adopt a systems approach (tempered with some vision). They should work to ascertain and to monitor trends and user preferences in the types of terminals and displays; the number required and their location; and the physical and psychological environment of catalog access points. They should also be aware of changes in the function of a user interface; user demands and expectations; and changes in software and hardware. They should be conducting ongoing research into system capabilities for networking and for downloading search data; the type and format of information supplied; and even possible charges for specific services.

Users' reactions to the introduction of online catalogs were well documented between 1979 and 1982, but evidence is scant for recent years regarding changes in users' attitudes. User behavior patterns are influenced by increasing contact and interaction with computers in other areas of life such as desktop office microcomputers, home computers, and automatic bank tellers. Librarians should be aware of these influences and should concentrate on developing systems which are more online and less catalog; a user-oriented rather than an AACR2-derived concept.

To promote the use and popularity of the online catalog, libraries must be prepared to compete in the retailing of information with market forces, albeit in a noncommercial environment. This implies concerted external and internal advertising of the library as an information center as well as a repository, in association with the ongoing development of user-friendly systems. Designers of online catalogs should make the reality of everyday life an objective, aligning online public access systems more closely with the way the user retrieves information outside the library through the television, telephone, radio, newspaper, or online. Online catalogs should be just as accessible, cheap, and entertaining, providing the wanted side by side with the not-sought-but-interesting and perhaps even the unwanted and discardable. The users of the online catalog should not have to order their thoughts any more than they would have to in order to read a newspaper for the headlines, general interest, market news, what's on, and funnies; and they should not have to control their subject search vocabulary any more than they are accustomed to when looking for something in the yellow pages.

The current realities of intellectual access to online catalogs is somewhat removed from these soap-box hypotheses. The first question is, what is the online catalog actually providing in the way of access to bibliographic data? All systems provide author/title access, in some cases only to short catalog records but increasingly to full bibliographic records. All the systems examined provided subject access through subject headings. The Library of Congress, Research Libraries Group, and the University of California DLA Group systems also provide subject access through keyword searching, and this is under investigation by J.R. Matthews Inc. and OCLC member libraries. Catalog failure occurs more often on subject searches than on author, title, or author/title combined searches. There are two reasons for this: the public expects more sophisticated subject access from an online catalog than from the card catalog; and they make more errors in attempting the subject search options, either because they are confused by Boolean logic when combining keywords, or because they are unaware that the subject headings under which they are supposed to search are, in fact, the same Library of Congress subject headings used in the card catalog and not some free-text option available in the online catalog. If the system fails to point out that the search vocabulary is controlled in this way and does not direct the user toward correct terms with "use" references and requests for more specificity, then he or she may be unable to complete a subject search. In this case, a user may resort to an ad hoc form of subject searching under the title search option in the hope that useful titles in the subject area may be pulled up or else a call number located which could be used for a shelflist search or for browsing the shelves.

All of these are options that were previously available from the card catalog, but the online catalog can provide other access points, namely, the facility to search by call number, by date, and by place of publication. These latter features are not yet widely available, although searching by date of publication is either already in operation or being developed by the RLG's and the DLA Group's libraries. It is possible that an online catalog will provide the user with expansion of bibliographic information in the form of access to abstracts and even to complete journal articles or individual items within books. These are facilities which move the online catalog closer to those online services available commercially. They are under investigation by some libraries but as yet have not been widely implemented.

The online catalog is providing other services for the user, the most important of these, in user terms, being the linking of bibliographic with status and location information. In this way, a user not only finds a catalog record but is also notified of the item's location and its availability for circulation. In some systems the user may then use the terminal to charge out or "save" (reserve) that item. Beyond this, in online catalogs that serve several libraries, the user is able to search the holdings of other libraries for an item not available in the local library and in some cases to charge that item out, if located, from another library. Some online catalogs also provide cross-references for name and subject searching and browse functions.

The user interface is an important extension to the online catalog, and a good interface may be the measure of a good system. If it is sufficiently "user-friendly" and "transparent" the user may well believe that he or she is communicating effectively and efficiently with the computer rather than with a mediator, but this does not matter as long as the user is comfortable and reassured about using the automated system.

The user interface should relieve the necessity for using search codes and avoid some confusions by guiding the user through his or her search in a step-by-step way with the liberal use of help screens and offering to explain data displayed and sympathetic error messages. In a sense, it is the user interface that does the computer's public relations work for it. It should be flexible toward change and updating, should be sophisticated and fast enough for the experienced user to use without becoming frustrated and bored, yet simple enough for the first-time user. It should provide features such as the ability to repeat a previous command and to scroll backward and forward in a long search without exiting from the search: the wrap-around of text, a display with a manageable amount of data at any one time and, most important, an easy and obvious way for users to correct typographical errors.

Help screens or menus which allow the user to choose clearly defined options are available on almost every system. Only about half the libraries surveyed had a user interface which offered an explanation of the data displayed. Despite this ratio this is an important feature since it is often the case, even when an item has been located and the record displayed, that a user may not understand what he or she sees, in fact may not even be able to locate which part of the record is the call number. This is an example of catalog failure; it is not something which is the user's fault, and the user must not be made to feel that it is. Most online catalogs provide some form of scrolling between screens, sometimes with limitations such as moving forward only, although recovering past data is probably frequently desired from this feature.

The physical considerations of online public access catalogs have been discussed in the literature to a much lesser extent than have the intellectual, yet these aspects, while possibly the more difficult to gauge, may also, in the end, prove to be the most influential factors in the library patron's decision first to use the online catalog and second on how to use it. I intend, therefore, to dwell at more length on these aspects. The public will come to terms, out of necessity, with almost any system, rationalizing that, as they know little of library or automation practices (and certainly less than those who are professionally trained), this is the way that it has to be. They will not, however, use screens with displays which hurt their eyes or terminals which are placed at a height which they find uncomfortable. The following support system factors should be taken into consideration when installing or expanding an online catalog: terminal types, printing options and displays; location and number of terminals; physical and psychological environments; promotion and advertising. These factors are not ranked in order of priority because they are interdependent.

Much has been written about the selection of terminals—either those with keyboards or with CLSI-type touch terminals—and this choice is largely determined by the type of system installed although some libraries have used a combination of both types. Some public libraries have opted for touch screens because they eliminate any need for the patron to type or to locate function keys and require only a knowledge of the alphabet (and some patience). This is not exclusively the domain of the public library, however, and academic libraries such as the University of Toronto Library have also chosen to use the touch terminals. Vanderhoef and Galina, in their article "Ergonomics of VDTs,"[7] argue for what they term "a human systems approach," which involves determining the type of CRT selected by the task to be performed. As online catalog terminals are unlike technical services workstations in the type of use that they receive and in that there is little keying of and much displaying of data, either type of terminal will have its benefits.

Whichever terminal type is installed, libraries must be aware that the hardware is likely to develop and obsolesce to a considerable extent within the first few years of installation, and terminals will have to be modified and replaced. Does the library replace terminals with personal computers equipped with easily modifiable interfaces and with other functions masked to prevent tampering; does it purchase the equivalent upgraded terminal, or does it buy a large number of the cheapest terminals available in the knowledge that this will be an interim measure and that more can be purchased for the same amount and, therefore, more access points can be supplied?

All of these options will result in a mixture of terminal types and displays being available to users at any one time in an established online catalog, and automation managers should be aware that this will have an effect on use patterns of terminals. It is particularly likely to increase the level of confusion that already exists when users familiar with the card catalog have to come to terms with the online catalog. When there is a mixing of terminal types, makes, or models, care should be taken to have features such as the keyboard layout, especially the Return/Enter, Backspace/Rub, Clear, and function keys as standardized as possible. Automation managers should conduct careful observation studies to determine user preferences in terminal types and displays before investing in new or replacement hardware. Observation at the University of Illinois Library has shown that a terminal that users do not like may not be used unless all the preferred terminals are busy, and this does not make for the highest return in terms of use from automation funds spent on the purchase of new terminals. (I also have a personal dislike of terminals which "beep" at the user—it always seems for no apparent reason. This beeping can cause embarrassment and the abandonment of a search if a user feels that public attention has been drawn to him or her.)

Users will make subconscious decisions about which terminal to use based upon the display, often after only a casual glance. A screen which is difficult to read because of bad resolution, glare, or angle, can be as off-putting as a display with too much data or with characters which are too small or unclear to be read with ease. These terminals will be used with reluctance, and those with poor sight—the older users in particular—will resort to using the more familiar card catalog where it is still available. Most systems use either a white or green-on-black display although amber screens are also worth serious consideration. While not yet widely used in the United States, amber screens have become the European standard where they are considered to be superior to other displays in terms of aesthetics and of lessening eye-strain.

The University of Illinois Library online catalog started with white-on-black Hazeltine CRTs, but these have been gradually replaced by IBM Personal Computers with a cassette user interface and a green-on-black display. Reverse images have been used to highlight display features such as system prompts. Some new noninterface terminals also have green displays and use of all those CRTs with green displays is measurably greater than those with the black and white. This may reveal a color preference by users, or it may be that users are associating the color of the display with the availability of the user-friendly interface which makes the PCs more popular than the terminals—which require the keying of search codes.

The demand for the facility to provide copies of the results of searches raises the issue of supplying printing facilities at terminals. In some cases it may suffice to supply scrap paper and a pencil at each terminal, but this is not sufficient for those who wish to transcribe large bibliographies or abstracts (where abstracts are available online). There are three options for printing search output, and each has different managerial and user implications. These have been discussed in some detail by Bennett Price in his March 1984 article.[8] Briefly, the options are:

1. to use a printing terminal directly to conduct the search;
2. to use a terminal with a slave printer attached; or
3. to send search results to a remote printer in a nonpublic area of the library.

Many users, particularly those of public libraries, are not going to want to wait—or to return—to pick up their printed output from a remote printer. In addition, the output may or may not be what they thought they wanted or were going to get. This approach also requires the user to give up his or her anonymity, and, consequently, privacy because of the need for some sort of identification to retrieve the hard copy. Other users may not want to remain at a terminal while it laboriously prints out their search results (which may be quite slow if, as is common, a slow but quiet thermal printer is used). By doing their printing on their own time, however, users may be more selective. They can check their output to see that it is indeed what they wanted, and they may modify their search strategies accordingly. Some systems enable the user to perform sorts on fields in order to print a bibliography ordered by call number, author, title, or subject descriptor. Printing terminals can be noisy and expensive to maintain, but they are fast becoming a facility that the library user expects to be available in much the same way as a photocopying machine. In fact it may be feasible to consider coin-operated printing facilities on much the same basis as photocopying machines, although librarians should be aware that there will be some of the same drawbacks—i.e., noise, intermittent use, maintenance requirements, and space allocation in a public area, as well as resistance to being charged for a library service.

Of the libraries I surveyed, only five have any facility for printing at the terminals in their main reference areas, and two have the option of remote printing. The Library of Congress and Ohio State University have installed a large number of printing terminals but the other three libraries have only one or two.

The location of terminals and the advertising of these locations will often predetermine both the number of terminals required and the way in which they will be used. Terminals should be located in high visibility areas: many libraries have arranged banks of terminals directly inside the main door to the library, in lobby areas, or in the same specified area on each floor of the library building. Libraries should, however, consider the possibility of having some single, free-standing terminals, and terminals in carrels. Users can be inhibited in their use of a terminal located in a bank or row of other terminals because of the personal nature of their search topics, or because they sense that their personal space is being violated by visible or invisible queuers, encroachers, observers, or baggage overflow from the neighboring terminal. Use of carrels such as those used for microfilm readers, while requiring space and power outlets, may get around the crucial psychological problem of user privacy as well as helping to remove those users who need to conduct long searches from terminals that could otherwise be designated as "express." Rather than being confusing, a variety of terminal positions may lead to more efficient use of the online catalog because of the increased number of psychological preferences being catered for. In systems which allow it, automation managers must also bear in mind that there are "hidden" terminals which are being used for remote access and that the number of these will continue to grow as more microcomputers become available for online work in offices and at home.

Although few libraries have performed formal queuing studies, those surveyed overwhelmingly responded that they seldom experience queuing. This can mean several things: that the online catalog is not in heavy demand, or that adequate access is being provided to the online catalog, or that managers simply do not know. Those libraries which recorded frequent queuing almost all said that they were planning to increase the number of terminals available in the near future to cater to the perceived need.

Promoting the existence of an online catalog outside the library building is a different matter from advertising the locations of online catalog terminals inside the library building. Libraries should pay careful attention to promotion within the parent institution, locally, and, where applicable, nationally. It is important to reach the general public, not just to communicate through the professional journals. This involves organizing an ongoing campaign of library posters and newsletters, and writing articles for the university and community media, as well as taking issue with the national media when it appears to be ill-informed.

In addition to having a high physical profile, terminal locations can be advertised by signs on other catalogs, above or beside terminals, and in library floor maps and guides. Most of the libraries surveyed have opted for signs near the terminals although some rely entirely on the visibility of the terminals. Where signs are deemed necessary, they should be worded in as "user-friendly" a way as possible.

The number of terminals needed can only be gauged by measuring at random times the amount and type of use that each terminal is receiving, and in this, only users within the library building can actually be taken into account. The location of terminals outside the library building in homes and offices should be encouraged with the library allowing for any extra computer load that might result. Use patterns will vary considerably with the type of library, category, or user, the time of year, as well as between the main and branch or departmental libraries. For those libraries which implemented online catalogs early in their development, original planning largely had to be based on trial and error, but structured observation of use patterns, both before and after the installation of the online catalog, can supply sound data for projections of need within an individual library. This is where libraries only now installing online catalogs can benefit by learning from others' experience.

More effective locating and advertising of terminals should lead directly to greater use. Once users become accustomed to the multiple physical and intellectual access points to the online catalog not afforded by the card catalog, there will in turn be a demand for more terminals. Libraries should be aware, however, that observation may also prove a need to relocate or remove some terminals altogether and should be prepared to act on these results even if this should stir library sensitivities or politics. There is no magic formula for calculating the number of terminals which should be available within the library, although a figure of one terminal per 200 users has been mentioned by Matthews as a suitable ratio to begin with when installing an online catalog.[9]

The most important consideration, apart from ensuring that the user knows that the online catalog exists—and is able to find it—is that the user knows how to use it. This is more than a statement of the obvious or an extension of the earlier discussion about the user interface. It is a consideration of how much the user knows, needs to know, and needs to learn in order to be able to retrieve desired items from the online catalog, and of how the library should be catering for this in terms of supplying instruction.

Donna Senzig writes in her 1984 article:

> People vary greatly in their understanding of the catalog, previous experience with catalogs, level and amount of bibliographic information required, and desire to learn how to use a catalog. The online

> catalog should be able to adapt to any combination of these factors that is presented by an individual user. Inexperienced users must be able to use the online calatog without extensive training; experienced users must be able to search the catalog without having to enter or receive superfluous or redundant information.[10]

The interface or software being used will supply a certain level of aid to users, but there is a need for user instruction over and above this on an optional basis. It is not possible—nor is it desirable—to coerce users into taking instruction, nor is it necessary to ensure that there is a learning process during their use of the online catalog. What is necessary is that there be enough available instruction that a user can use the system without needing to memorize or understand. There are several methods being practiced:

1. *A brief flier readily available in the terminal area.* These should preferably be printed on one sheet of colored paper and should give very simple instruction and graphics explaining basic search strategies and indicate the location of the necessary keys on the keyboard. If search codes are used they should be listed on a card attached to the front of the terminal.
2. *Detailed manuals made of some durable material available, preferably, on some sort of reading stand at least at every second terminal.* These require a longer time to read and use, but experienced or curious patrons often wish to use the subtler options offered by the system.
3. *Formal bibliographic instruction in the form of organized public demonstrations by library staff, or compulsory class exercises in an academic library.*
4. *Informal bibliographic instruction available on an ad hoc basis from reference or information desks.*
5. *Audiovisual aids such as tape-slide presentations.*
6. *Online tutorials.* These also have the advantage of making the system more user-friendly and self-sufficient.

At least at the initial implementation of the online catalog, it may prove necessary to designate staff specifically for bibliographic instruction, but their effectiveness should be monitored. Once users become accustomed to the concept of an online catalog, many will prefer to work the system out for themselves using the available aids rather than staff mediation.

Of the libraries surveyed, most were using, simultaneously, four or five of the options just described with the brief flier and informal instruction being the most commonly used methods (although not necessarily the most popular), and the slide-tape show the least. The facility for an online tutorial is available as an option in at least some of the libraries from all of the groups surveyed, although it is not used by all of those libraries.

Consideration of the psychological and physical terminal—and hence user environment—includes factors necessitated by machines such as air circulation and temperature control, and outlet or dial-up dependency, as well as those steps taken to ensure the comfort of the users. A balance needs to be maintained between these interests. Machine needs should not dictate the level of user comfort. Screens should tilt and the brightness be readily adjustable by the user without having to involve staff. Keyboards should be detached from the CRT to enable them to be rearranged for the convenience of the user. Lights should not be set overhead, behind, or in the line of vision in such a way as to cause glare, reflection, or eyestrain. If necessary, terminals should be fitted with glare shields or covers to counteract this (a minor financial outlay).

The height at which the terminal is set is dependent upon whether or not seating is provided. Seating at a terminal in the form of a solid chair with back and no arms is the most comfortable for the user who prefers or needs to sit. However, it may also encourage excessively long terminal use times, or encourage those who are waiting or resting rather than using the online catalog. Many users will find a terminal placed on a tall table at standing height to be uncomfortable to use. These are also inaccessible to those in wheelchairs or unsteady on their feet. A compromise has been to use tall stools with these terminals to relieve discomfort but to discourage lengthy use. Again, where possible, the automation manager should try to cater to as many user tastes as possible by mixing the heights and seating arrangements available.

Observation of the University of Illinois Library terminals, which have a mixed arrangement, showed that casual users were inclined not to sit in chairs, but that the availability or absence of stools did not perceivably affect which of the tall terminals they chose to use. Some people liked to sit and if there were no stool at that terminal they would remove one from a nearby terminal if one were free. If people liked to stand and there was a stool at their terminal they would push it aside. The most important physical factors were the availability of a bar under the table to rest feet, whether standing or sitting (which ties in with Matthews's recommendation for a footstool at a seated terminal[11]), and the provision of sufficient space around the terminal for coats, books, and bags. Most libraries surveyed also chose to mix the seating arrangements at their terminals. Almost all opted for a much greater proportion of one to the other, the majority preferring to emphasize standing-height terminals.

No online catalog now in operation is a panacea to all access ills. Because the public cannot obtain a visual image of the extent of the online catalog, and because it is computer-based, the mistaken assumption is often made that it is a comprehensive catalog of all library holdings. Different systems have different types of material online, and different libraries have reached different stages in programs of retrospective conversion. Specific types of materials and formats have proved problematic to catalog in a machine-readable format. The most important categories of these are manuscripts and archives, government documents, microforms, serials, technical reports, audiovisual materials, maps, and music scores.

All this raises questions about what additional catalogs may need to be maintained and how users should be informed of the possible need to use them. Three of the libraries surveyed—Dallas Public, Iowa City, and the State Library of Ohio—have disposed of all other catalogs altogether. To do this the online catalog must contain as many fully cataloged items as possible, reference staff may have to supply more aid in locating difficult items, and, as there is no alternative catalog available, the online catalog will have to be as accessible and reliable as possible. Other libraries must rely on one or a combination of methods such as online notices; signs near terminals; at other catalogs or in other locations; fliers, reference/information desk help; library handbooks; and campus or community media. Of the organizations looked at, the University of California DLA Group conducts the most comprehensive advertising of their supplementary catalogs since the member campuses are undertaking extensive retrospective conversion projects.

Budget may well be the deciding factor as to whether or not to retain existing or maintain additional catalogs. If libraries decide to dispose of the card catalog but consider computer downtime to be an important negative consideration, they might well consider a COM printout of the catalog every six months. The initial run and the COM readers will be expensive, but this provides a useful and fairly recent backup to the online catalog.

Libraries surveyed were asked a final question "Is there evidence of any increased or decreased use of the catalog or collection since the introduction of the online catalog?" and the answers proved both interesting and startling. No library apart from Iowa City Public Library had hard, reliable statistics available. This was either because the relevant measurement and evaluation was not being conducted, or because statistics which had been gathered were incomparable for some reason. The respondents (all questionnaires were completed by the person responsible for managing the online catalog) relied for the most part on their intuition and on the experiences of their reference staff. All but one respondent noted increases in circulation and intersystem loans, and the general impression was that the online catalog was more heavily used than the card catalog, although few had measured use of the card catalog prior to the installation of the online system.

Perhaps the comments from Stanford University's survey response articulated best the general sentiments of the respondents:

> Marked improvement in search flexibility provided by SOCRATES seems to make "foraging" expeditions more attractive. We have no hard data beyond the sense of those who see the system in regular, heavy use.

Iowa City Public Library conducted an identical survey between use of the card catalog in 1973 and of the online catalog in 1984 and recorded three times as many uses in the latter. The 1973 survey showed that 19 percent of the patrons used the card catalog, the 1984 survey showed that 36 percent used the online catalog.

For libraries conducting use analyses of their online catalog, some of the following questions which should be considered are:

—Has the increased number of intellectual access points increased users' expectations from a catalog? If so, in what way?
—How much are users being affected by the type of terminals?
—How much are users being affected by the location of terminals?
—How can more users be persuaded to use the catalog?
—How long is an average user search?
—How are users coping with the concepts of subject searching?
—How is catalog use different in other library locations such as branch and departmental libraries? Or from nonlibrary locations such as offices and homes?
—How do users feel about using supplementary catalogs?

I have discussed points that librarians should be aware of when considering use evaluation of the online catalog and system improvements and some of the options which are currently available. I want to finish by making some brief recommendations about managerial awareness—a central concern of this paper:

1. Perform a use analysis or systems evaluation of the current system as this will help to highlight problem *and* success areas as well as establishing points of reference and comparison.
2. Institute regular review procedures of circulation statistics, search hit rates as monitored by the online system, and observed use patterns.
3. Constantly review the user interface.
4. Talk to other libraries to find out what their experiences have been and how they have chosen to deal with similar situations.
5. Involve as many external people as possible in the development of the online catalog. It may be time-consuming, but this not only brings in different perspectives, it is also good public relations and is educational for both sides.
6. Publish and promote your own experiences and developments.
7. Beware of misinterpretation of data or action taken on the basis of "intuition."

These measures do cost money and should be weighed in terms of benefit and applicability. They should, however, help in the building of a user and use profile that will be specific to one library and that will, therefore, be of more practical use as a basis for decision-making than any general standards or guidelines that can be drawn up for the development of the online catalog.

APPENDIX

QUESTIONNAIRE ON ONLINE CATALOGS AND LIBRARY USERS

Name of Library: ______________________________
(Please fill out all applicable responses)

TERMINALS

1. How many terminals are available for public use? ______

2. How are terminal locations advertised?
   signs on card catalog ______ signs in other library locations ______
   signs near terminals ______ directional lines on floor ______
   other (please describe) ______________________________

3. How many terminals are placed at a height for use:
   while standing ______ while seated ______

4. How many terminals provide printed output? ______

5. How often do patrons have to queue at the most heavily used terminals?
   frequently ______ once or twice a day ______
   seldom ______ never ______

ONLINE CATALOG

1. Does the online catalog provide:
   subject access through subject headings ______
   subject access through keywords ______
   access by date of publication ______
   access by place of publication ______
   access to individual journal articles ______
   linkage of bibliographic and circulation information ______

2. What library holdings (if any) are not included in the online catalog?
   (e.g. microforms, pre-1970 acquisitions) ______________________________

3. How are users informed of the possible need to search additional catalogs?
   notice from online system ______ signs in other library locations ______
   signs near terminals ______
   signs at other catalogs ______ flyers or handouts ______
   other (please describe) ______________________________

4. What training is provided in the use of the online catalog?
   online instructional package ______
   brief flyer/handout ______
   lengthy flyer/handout (3 pages or more) ______
   slide/tape program ______
   informal instruction by staff ______
   formal (bibliographic) instruction by staff ______

5. Does the user interface:
   provide help screens ______
   offer explanation of data displayed ______
   allow movement backward and forward between screens ______

6. Is there evidence of increased or decreased use of the catalog or collection since the introduction of the online catalog? If yes, please describe briefly: ______________________________
   ____

In case clarification or additional information should be needed, please include the name and telephone number of the person completing this survey:
Name: ______________________________ Tel.No.: ______________

THANK YOU

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SUSAN ROMAN
Executive Director
Association for Library Service to Children
American Library Association

Online Catalogs and Specialized Clienteles: Children and Youth

Editor's Note: At the time she delivered this paper, Susan Roman was Head, Youth Services, Northbrook Public Library, Northbrook, Illinois. Her examples are from that public library.

"Whether we like it or not, the child today is far more sophisticated, independent, and knowledgeable than his peers of a generation ago. Have most children's librarians recognized and accepted this fact? I think not."[1] This statement by Elizabeth Gross Kilpatrick in discussing the future of library service to children, could be made stronger. Those who set policy—library managers and trustees—often fail to recognize that children of today are more sophisticated than children of a generation ago. And what is most disturbing is the statement that was quoted was made in 1968 and we still have not accepted it. What implications can be drawn and how can we apply them to online catalogs?

Although online catalogs have been in use for only a few years, they have had great implications in library service for all users. The broad applications of library automation are familiar to many librarians, but it is time to focus on smaller segments of the population within the library market. The amount of information available is staggering, and one of the items on the library agenda for the eighties is who should have access to this information.

Likewise, the amount of information about library holdings that is accessible via online catalogs has increased. In support of the American Library Association's Bill of Rights, we must ensure that youngsters have equal access to online catalog information. Dorothy Broderick, the well-known advocate for youth, states that because of online capabilities a huge supermarket of information exists in the library today. The problem is that for many librarians the only people "deserving" access to that supermarket are adults.[2]

Librarians must address the needs of youngsters in the planning process. As a clientele, young people cannot always articulate their felt or unfelt needs, or they may not even be called upon to express their concerns. However, children have legitimate needs. In addition, the youngsters of today will soon be college students and workers-in-training and, later, adult users. Today's youth will be the ones voting for library legislation and supporting our libraries. Children and youth are our future. Therefore, librarians' role as advocates for youth must be exercised, and librarians in all library departments, in all kinds of work in public and academic libraries, need to consider services to children and youth when setting library policies and user training programs.

A case in point is the Northbrook (Illinois) Public Library. Always a forward-thinking institution in terms of library technology, the library was in the first library consortium in the country to have an online circulation system. And, as advances were made, the librarians at Northbrook worked toward the time that librarians and patrons would be using online catalogs. I took it for granted there would be catalogs in each of the departments. It was not until I was asked to appear before our library board to explain why there should be online catalogs in the youth services department that I realized that was not a safe assumption.

Literature Search

Library literature had little to offer in the way of articles dealing with youth and online catalogs. However, other relevant and interesting information was uncovered that demonstrated the importance of online catalogs. This broad-based reading revealed much, including some material of direct relevance for my presentation. Michael Gorman wrote that the online catalog will be the greatest symbol of change, the greatest instrument of change, and the greatest result of the revolution in libraries of the recent years.[3]

A research finding indicated that 94 percent of all library users prefer online to card catalogs.[4] How could we make use of this information in planning at Northbrook? What about our community; would our users feel the same way? What were the implications for staff in an already very busy department with a large collection of materials and a full service of programs?

Initial Staff Involvement

Each staff member in youth services was asked to discuss and decide whether we wanted, or needed, online catalogs for youth and why online catalogs would be better than card catalogs. We brainstormed and collected all of the reasons why we should go online as well as the drawbacks we could envision. By the time I was scheduled to report to the library board, we had come up with user benefits and staff/library benefits. Staff benefits became increasingly important because we began to realize the amount of time we would need to educate our users to the new online catalog. Space planning also became an issue. Where should we put the new terminals? Additionally, publicity via newsletters, handouts, and bookmarks was discussed.

Northbrook Public Library had six card catalogs for the public: (1) adult author/title, (2) adult subject, (3) children's author/title, (4) children's subject, (5) adult music, and (6) children's music catalogs. In addition, the physical arrangement of the library allows for all public services to be on one floor. However, public services areas are peripheral to a central core of library offices. This is important because it is not easy to see into another department except at corners, and using a different catalog takes the user around the building. Another fact is the library belongs to a cluster with twenty-three other libraries giving us a large database.

User Benefits

The online catalog offers direct user inquiry and increased self-help. Because there is access to more information than in the card catalog (e.g., the number of copies and all formats), the librarians need to assume their role as teachers of library skills to make users more independent.

Usually a user only wants to use one catalog where all formats are available. If a patron does not find what he or she wants in one search, the patron usually assumes the library does not have it. Users will not persevere in the same way as librarians who are trained to explore all possibilities. Many online circulation systems provide holdings and location information and sophisticated users know it. They want to get at the information directly. On many occasions users ask reference librarians for circulation information by asking to use reference desk terminals—i.e., patrons are very much aware of the amount of information that is available.

In an online catalog, the patrons can see when an item is due back and can make a decision whether to reserve the material, request an interlibrary loan, or try another library directly. They may need the material quickly and waiting for the due date may take too long.

If the local library does not own a title, patrons can see what other library has it and pursue it on their own or through interlibrary loan. Indeed, the fact that most of the twenty-three libraries in the service cluster do not own a particular title also provides information. One very intelligent parent checked for a book that was suggested by a friend. When she found that only two libraries owned the title she became doubtful of its worth. It provided an opportunity to give reader's advisory service.

Northbrook's juvenile collection of paperbacks and young adult paperbacks are listed only in the computer. Patrons cannot look them up any other way. This decision was made about five years ago when we initiated a new young adult paperback collection. Where would we file the cards? The idea of a separate young adult collection of titles would be defeated if we filed the cards in the children's catalog, and the adult catalog was located in the adult reference department, far from those giving reader's advisory help to teens. Knowing that we were moving toward an online catalog, we made the decision to have the titles available only online.

Research shows that patrons want many terminals in convenient locations. Young children, more often than not, come with parents who may want materials of their own. The adults can check out their books without having to leave children alone while going to other parts of the library in search of the appropriate card catalog.

The call numbers or locators would be better for new materials than they were in the old card catalog because the online catalog afforded new capabilities. The expanded format provided notes on each search of titles, subject headings, joint authors, and illustrators, rather than limiting notes to main-entry searches.

More accurate and up-to-date information is available in the online catalog. In the card catalog there was a lag between the time the material went on the shelf and when the cards were filed. Additionally, no matter how careful we were in maintaining the catalog, there were filing errors.

Library/Staff Benefits

Each department filed cards in its catalogs and pulled flagged items and card sets for discarded items from its catalogs. Librarians and staff could have used that time to give increased service to patrons and to explore new areas of service. Not having to file and pull cards would result in direct cost savings.

With less time spent maintaining the catalog, librarians and staff could cover the public services areas more effectively when short-staffed. With the online catalog, staff in the children's department can place reserves or give patrons locations without leaving the department.

After my presentation to the board, one of the trustees asked an important question. Why would the youth services department need online catalogs since young children cannot read, spell, or type? I explained that those youngsters, either by virtue of age or ability, who could not use the online catalogs would not be able to use the card catalog either. Such youngsters are generally brought to the library by an adult or older child who helps them find materials. The same child who would need assistance to use the online catalog would need help in the card catalog. Our youth services department serves children from birth through eighth grade and also those interested in children and children's literature—i.e., users of all ages.

Another trustee questioned whether children could hurt the database by touching different keys or the screens. The online catalogs for the public have a limited use—title inquiry only. Users have no access to the item or patron entries nor the capability to change the database. Of course, the staff may have to clean the screens fairly often and reset the keyboard, but we can accommodate these needs.

After successfully presenting the request for online catalogs, we proceeded with staff education and anticipated questions and problems our users would encounter. We used the same instructions as the adult department planned to use in order to give uniform instruction within the library. Helping all library staff members learn about the catalog provided an opportunity to determine some of the questions the clientele would ask. We started with touch terminals in July 1984 and in February 1985 we got keyboard terminals. What height should the tables be for children? Should there be chairs next to the catalogs or not? Which terminals would users like best?

Research by Observation

When we installed the touch terminals we discovered a lock on the back panel. Since the staff needed access to the on/off switch, we left it unlocked. It did not take us long to discover that little, and not so little, hands were also reaching behind the terminals. Because many children are taught to boot up the programs on microcomputers by using the on/off switch, our users thought they could begin a new search that way.

Unfortunately, while reaching for the on/off switch, users hit flywheels and buttons thereby creating problems. It took us a short time to figure out why the configuration needed to be readjusted so often, and we decided that locking the back of the terminal reduced both patron and staff frustration.

Young people walk straight up to the terminals and begin to work on them. If the terminal does not work, then, and only then, do they read the instructions. The adult department puts out stacks of instructions while the children's department replaces instructional brochures every few days or so. Adults stop and stare, but they generally do not willingly approach the terminals. The adults need to be encouraged to try. One woman said that she would continue to use the card catalog. Once the staff explained that new materials could only be found online she decided to try using the terminals.

Subject searches, so often necessary for school reports, take some time. Accordingly, at least one terminal at seated height is necessary. Also, a parent with a child in arms needs to sit while conducting a search.

More children are requesting interlibrary loans. Where once we used to suggest the interlibrary loan alternative, we find our sophisticated users initiate interlibrary loan requests after using the online catalogs.

Youngsters who have microcomputers at home want to know how soon we will have dial-up access to the online catalog. We give them an inch, and they want a mile!

Just as the staff is alert to helping someone who stands at the card catalog for a long time, we listen for the "beeps" of our new terminals and then try to offer assistance.

The touch terminal may be slow for some author/title searches, but it is really good for subject searches. Since the screen does not scroll, youngsters have more time to get information from the screen display. However, the next generation of keyboard terminals offers many more display alternatives that will help subject searchers.

We find our users are attracted to a bright screen. We tried computers with differing screen intensities and found that the users preferred a brighter screen. The terminals with screen-saving capacity that shuts off the display after a certain period of time, are even less attractive to the user than the dull or bright screens. Apparently users are interested in the text on the screen, and they stop to read the information.

Once users see the capabilities and information available in online catalogs, they notice mistakes and question the staff closely about materials. Suddenly our mistakes are glaring us in the face! And users check to see if the mistakes have been corrected the next time they visit the library.

The staff has tried to be very encouraging about the capabilities of the online catalog. We use the online catalog to demonstrate library skills for visiting classroom groups, scout troops, etc. Because they have been involved from the beginning, working with the online catalog generally has been a positive experience for staff.

It is difficult to write good directions for using the catalog that will be helpful to both children and adults. We find that a one-to-one approach is best. But that is nothing new to librarians.

Because the library's entire collection is in one catalog, the staff has been able to save time previously spent doing tedious card catalog maintenance. As a result we have been able to spend more time with users.

Youngsters who did not use the card catalog are eager to try the computer terminals. Those who routinely walked past the card catalog straight to our desk for help often try the online catalog first.

Accuracy becomes very important in searching online. Our youngsters are encouraged to become better spellers.

Many youngsters had only viewed computers as game machines. The online catalog gives them an opportunity to see other possibilities for computers.[5] As a result, basic computer literacy is reinforced for the users. More adults ask children's department staff for help. We place more adult reserves and requests from the children's department because patrons can use the catalogs in our department for their material needs as well.

Summary

Indeed, children seem to use the online catalog more quickly and to use it more often than adults.[6] Children often show adults how to use the new technology. More often than not I have seen parents defer to their children when it involves the computer catalog. Children have few of the hangups that most adults have. Kilpatrick was right when she stated that children are more sophisticated, independent, and knowledgeable than children just a generation ago—especially when it involves computer technology in the library. Youngsters have a right to the advantages this technology offers. Therefore, it is in our best interest to ensure children's access to technology. Children's enthusiasm for the technology may help ease other users' and staff members' resistance, too.

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LESLIE EDMONDS
Assistant Professor
Graduate School of Library and Information Science
University of Illinois at Urbana-Champaign

Online Services and Specialized Clienteles: Handicapped and Other Populations

My topic is service to other special populations and online catalogs and library automation. The special populations to be examined are the handicapped, the elderly, and the non-English speaking. It should be pointed out that although this paper's topic is the relationship of automation to patrons, most of the issues apply to employment of persons from these target groups. Affirmative action issues oblige librarians to consider the special needs of employees in addition to having the responsibility to serve patrons with special needs.

There are some general concerns librarians need to address when attempting to make online catalogs available for use by special groups. Librarians need to become knowledgeable about the needs and adaptations of each specialized group, then, as Susan Roman suggests for youth, the librarian must become an advocate on behalf of the special patron to ensure the adaptation of automation services through physically and intellectually appropriate system design.

Serving Handicapped Persons

Most librarians have the potential to serve both the physically disabled and the intellectually impaired. The definition of a handicapped condition used in this paper is a physical or intellectual anomaly that presents the individual with difficulty in dealing with a built environment. The library as a whole presents both a physical and intellectual environment. Specifically, online services are designed in such a way as to present impediments to use by both types of disabled persons.

Based on 1970 census data and using Illinois as an example, about one out of every seven noninstitutional adults is disabled and about one in twenty is severely disabled.[1] What is striking about these numbers is that I have not observed this high a proportion of disabled individuals among most library user populations. There are two reasons for this. One cannot always tell by looking whether an individual is disabled. The other is that many disabled persons do not use libraries either because of architectural barriers or the belief that libraries are not for the disabled.

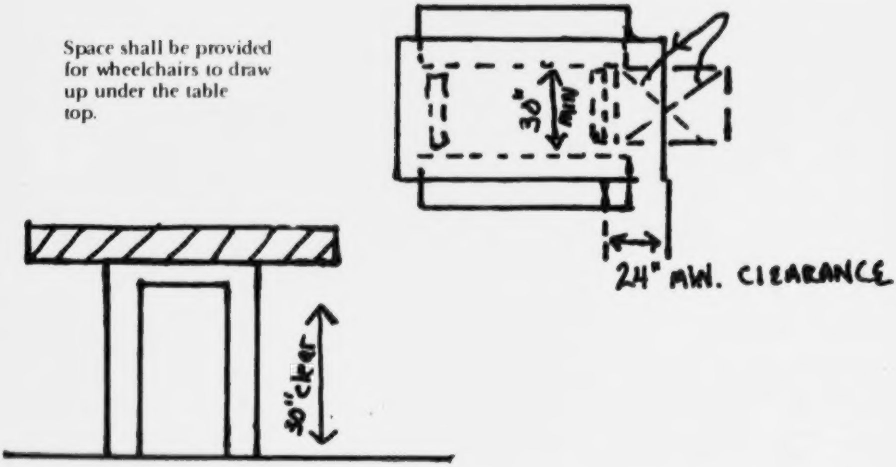
As many librarians are aware, access to publicly supported services is a legal issue. The Architectural Barriers Act of 1968 (PL 90-480), states that "any building constructed or leased whole or in part with federal funds must be accessible to and usable by the physically handicapped."[2] More recently PL 94-142, the Education for All Handicapped Children Act of 1975, requires education for handicapped children in the least restrictive environment possible. These laws directly affect school and academic libraries by requiring service to handicapped individuals in the same environment in which service is provided to others. In addition to federal law, state and local governments legislate the physical access and nondiscrimination in services offered by agencies using public funds.

Going beyond legal issues, it can be argued that, librarians, as members of a service profession, have a moral or ethical responsibility to adapt services and environments to be usable by disabled people. I do not think, however, that in practice librarians demonstrate enough concern for these issues. Often the attitude is passive rather than active. If a disabled person asks for service, he or she receives it, but there is no interest in adapting the environment in anticipation of the disabled person's needs. Service to special groups is often viewed as a luxury that most libraries cannot afford. Probably the first step to serving disabled people and providing usable online services is recognizing that serving the disabled is an essential institutional commitment, not just a nice idea when one gets around to it.

In examining automated service and the use of online catalogs by disabled persons, one must consider both hardware and software. The first step in providing for the use of online catalogs by the disabled is to look carefully at the architecture and interior design of the library. To help in this evaluation one should check local and state building codes and measure the library's space arrangement against the standards.

The two aspects of interior design most pertinent to online catalog use by those in wheelchairs or the orthopedically impaired are table measurements and placing terminals within comfortable reach. A comfortable and efficient environment is essential for successful online use. Tables should be 30 inches high from the floor to the lip of the table, be 30 inches wide and have 24 inches clearance (see fig. 1).[3]

Figure 1. Minimum Table Requirements



Space shall be provided for wheelchairs to draw up under the table top.

Without a properly designed table the person in a wheelchair will be too far away to reach the keyboard or adjust the terminal comfortably. The placement of tables should allow a person in a wheelchair or one who must sit, to use both the keyboard and monitor.

It may be that physically disabled individuals will not be able to use a keyboard. For instance, a person who has restricted use of arms, has poor small-motor control, or who is severely sight impaired may not be able to use an online catalog, but be able to use bibliographic citations or material (e.g., large-print books) housed in the library. It should be library policy for staff to make the extra effort to do a full search for the disabled patron. If a library serves a community in which there are special programs or residences for orthopedically disabled people, it may be possible to adapt a terminal for use by these patrons. Peter McWilliams has written a useful and thorough book on adapting personal computers that will give librarians an idea of what can be done.[5]

Most building codes as well as common sense stress that while it is necessary to provide access to enter the library as well as inside the building, it is not necessary to have *every* table adapted to accommodate wheelchairs. It is important to have a terminal available, have it centrally located, and make it well known to the community that this environment is available.

For other disabled groups, the concern moves from hardware to software. From the hearing-impaired, online catalogs can help bypass the numerable communication problems the individual has in finding library resources. The online catalog, once mastered, can reduce the need for the hearing-impaired person to communicate orally with library staff and, in effect, open the collection to those with severe hearing loss. Librarians should arrange for training, including learning sign language. As many of the hearing-impaired have difficulty with spelling and grammar and with learning language skills, training should be carefully planned, and extensive reinforcement and practice will be necessary. Programs need to be very friendly, with well-developed help and error sequences.

Another group of disabled patrons is those with intellectual impairment. They include the retarded and the learning disabled. The profoundly retarded are excluded from this discussion as they do not need catalogs. They use library facilities as browsers, bypassing both card and online catalogs. The primary aspects of intellectual impairment are diminished memory, attention span, and capacity to spell and use words. Normal adults can hold five to seven items in short-term memory. Retarded individuals can hold fewer items, and the learning disabled cannot keep items in order. For both groups, small amounts of information presented in a highly organized structure enhance learning. As with the hearing impaired, spelling and vocabulary present constant problems and a learning session should be short with ample repetition and practice.

In translating these considerations to online catalog use, the focus should be on the design of the software and well-planned training. Touch screens probably are easier to use for the intellectually impaired as they eliminate the need to type words. Many touch programs, however, require alphabetizing skills that may be difficult for disabled patrons. This is an aspect of using the online catalog that will have to be included in training. Programs should scroll slowly to allow for use by slow readers, and help and error functions should be clear and easy to manipulate. The program should allow the user to determine how long a screen will be displayed and not have automatic limits.

The other area that needs modification is the amount of information in the online catalog. For librarians it is a strength to cram as much information as possible into each file. For most patrons this is confusing. For the intellectually impaired it can be devastating. Information overload and the use of jargon and acronyms can make online entries unintelligible. Entries should be standardized, clearly organized, and use the simplest form possible.

As with serving other disabled groups, both staff and the intellectually impaired will need training. Staff should be made aware of the characteristics and capabilities of the mildly retarded and learning-disabled adults.

This will help staff be more patient with errors and more effective in assisting patrons with the online catalog. In designing training of intellectually impaired people, librarians should seek advice from specialists in these areas. Local agencies or groups serving adults with learning impairments may be able to help in planning realistic training programs and help in promoting the library's services to the disabled.

The key considerations in providing online services to handicapped individuals is to plan an environment that allows physical access, to provide training that is suited to handicapped persons, and to understand that handicapped persons—like all persons—need individual help. If library staff are rude or stereotype disabled persons, these patrons will not make the effort to use online catalogs. To insure that the software is as usable as possible for a variety of disabled users, librarians need to keep the needs of the disabled in mind when working with programmers and vendors.

Serving Elderly Persons

The second special user population is individuals over the age of sixty-five. About 11 percent of the American population is over age sixty-five, and this is one of the fastest growing segments of our population.[6] Most libraries immediately affected by this demographic change will be public libraries, but as community colleges and universities seek to attract students outside the traditional eighteen to twenty-two age group, more senior citizens will want to use academic libraries. This population will need special help in adjusting to changes in libraries related to automation.

Knowledge is a key component to effective service. Librarians need to be knowledgeable about the aging process and sensitive to designing services that meet the elderly's needs. Experts in gerontology describe the elderly population as varied. Not all abilities deteriorate at the same rate and each individual has his or her own combination of skills. In general, there are more elderly women than men, and those over sixty-five tend to be less well-educated than younger Americans.[7]

The elderly may need specially adapted environments (e.g., be able to sit while doing a search, or to view entries on large-print screens) because of physical disabilities associated with old age. The librarian also needs to create an environment in which the elderly will feel comfortable in using automated services. Often we associate resistance to change with aging. Librarians need to avoid stereotyping or condescension. Training for the elderly should be well planned and give opportunities for self-paced learning, and practice and reinforcement to allow for skill development in each individual. Librarians should be prepared to repeat instructions and be patient with persons who progress slowly.

Another activity that will be productive is to cooperate with agencies and individuals who work directly with the elderly. Senior citizen centers can be an important link in publicizing and legitimizing changes in service in the library. Coordination with agencies serving the elderly and other special groups can suggest target training and design of services for each group. This will help librarians achieve the goal of effective use of online catalogs by all groups in the community.

Service to Non-English Speakers

There are more than 1.3 million students in America's schools whose primary language is not English and who receive bilingual instruction.[8] In Illinois, the largest immigrant group is made up of Hispanics. The Asian population is significant in numbers and there is also a stable number of students whose primary language is Polish or Greek.[9] In my last job, I developed library services in Chicago for Head Start, the federally funded preschool program. We identified over fifty language and cultural groups and, in general, we found most of our clients eager and excited by library services we offered. Many universities and colleges have increased enrollments by admitting foreign students, so both public and academic types of libraries need to examine services to the non-English speaking.

There are three service areas of concern when helping non-English speakers use online catalogs. First, instruction sessions, signage, and written explanations should be bilingual. The librarian may need to find a language volunteer or consultant to help develop programs and handouts. Many foreign citizens and students read English more effectively than they listen to spoken language, so once instruction takes place, effective use of online catalogs can take place.

A second area of concern is that of cultural differences. Many foreign-born persons do not fully understand American libraries. They are not accustomed to the openness or the vastness of the resources available. Also, they may not feel comfortable in seeking help from librarians. It is important to stress some of the basic rules for library use as well as the use of online systems.

Third, it is important to create non-English databases. Often non-English titles are the last to be put online or are never put in machine-readable form. If the library has non-English materials, there should be non-English citations in the database. It would also be interesting to have databases where commands were in a language other than English. Work is now being done to perfect programs that translate from one language to another. If this is developed we could even provide bi- or trilingual online catalogs.

It is important to provide for meaningful use of online catalogs to non-English speaking patrons. To do this we must respect cultural differences that might exist, provide training and training materials in appropriate languages, and speed the development of databases to include non-English entries and bilingual commands.

Conclusion

The purpose of this article has not been to introduce startling new ideas about human issues and automation, but rather to remind librarians of their responsibility to serve all segments of the population and of the capability to expand the body of library users by keeping an open mind and doing careful planning.

Information is power. Those "in the know" will go farther than those who are ignorant. We have designed and now work to perfect online catalogs and automation systems to provide better, more fair access to information. We must take the responsibility to ensure that online catalogs are usable and useful to the disabled, the elderly, and the non-English speaking. Librarians have the intelligence, the creativity, and the energy to provide access to all groups within the community served. It only remains to make the commitment to use our capabilities to help special populations.

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MARK W. ARENDS
Assistant Professor
School of Art and Design
University of Illinois at Urbana-Champaign

Designing Effective Instructional Brochures for Online Catalogs

Computerized catalogs are becoming a standard feature in libraries today. The question of how extensively computers will, should, or can economically be used will not be answered for a long time, however. Currently online catalogs, material management, billing, interlibrary loans, and, in some places, electronic information services are being installed across the country and, as with all new systems, computerization is creating some problems for users—particularly in how to use the computer to locate materials. The immediate solution to this problem is to provide printed instructional materials for the user.

I have looked at a good sampling of instructional folders for using library computer systems. By and large the content is good and the systems they describe are user friendly. However, there is a common problem with the visual presentation and readability of the information. I would like to show some examples, discuss where problems occur, and then suggest some guidelines for producing more effective literature.

Probably the best solution to the problem of user instruction is to have the computer do the work by displaying step-by-step instructions along with a menu on a touch-sensitive screen. This will not eliminate the need for printed instructions but those that are needed will not be so vital to the system and, therefore, the design demands will be less critical.

Part I—Examination of Brochures

In very general terms, there are two situations that make it difficult to design effective instructional brochures. The first is that most of us have been verbally trained, which means the content and logic of the instructions can be very good. However, we respond most effectively to instructions which provide strong visual clues. The good, clear, written instructions are only half the battle. There must also be a clear, concise layout and appropriate visual clues for the instructions to be effective.

The second problem of designing instructional material is the overload of advertising materials we are subjected to. Most people—including many designers—are not accustomed to designing informational literature and when asked to do so, tend to "oversell" the information by trying to create visual appeal rather than readability. The opposite reaction—i.e., of trying not to compete with the slick quality and expense of advertising—often hinders quality design by resulting in a simple, straightforward typed list of instructions. In either case, the effectiveness of the instruction for the user is reduced.

In general there are five parts to a brochure: (1) the title page, (2) the library system and logo, (3) a description of the computer system, (4) a step-by-step procedure, and (5) a diagram of the screen with a key to the abbreviations. I will quickly discuss each of these areas and describe how design can help to present the information.

The title page. The major purpose of the title page is to tell what the literature is for and to identify the library. The title should be a major headline—probably near the top of the page—and the library identity should be kept brief and used as a counterpoint to the headline. Subheads may be needed to further explain the major headline and these should be near the major headline yet in a smaller size typeface.

Pictures and other information may be added, but they should not compete with the headline for visual prominence. They may also be difficult to reproduce and, if they are, they may lower the perceived quality of the brochure. The most common problem on a title page is too much information or unnecessary images crowded onto the page. Group the information, leave some white space or blank areas, and exaggerate the contrast between elements. For example, use a large headline with a small subhead.

The library system and logo. The library system name and logo information may be in two parts with a logo or name on the title page and a descriptive paragraph or list on the inside or back cover. Usually there is only one library in town, so there is little need for the name to be conspicuous. It is important, however. A logo is a difficult element to handle. It often seems to pop out on a page and not relate well to the layout. Avoid making it too large or crowding it close to other elements. A logo is a separate design statement and needs some white space to fit well on the page.

Description of the computer system. The description of the computer system is usually a statement of what the computer can do for the library patrons. Commonly it is the best handled area of a brochure as it is the most verbal and least visual part. Short statements with clear headings are the most effective. It is easy to try to spice up the look of this information by using colored inks and decorative type styles. These often have a tendency to reduce legibility, however. By thinking of the description as text copy—as in a book—the urge to overdo can be curbed.

Step-by-step procedures. Laying out step-by-step procedures is the most difficult design problem in an informational brochure. Eye movement from the screen, to the brochure, to the keyboard is rapid and easily frustrated by instructions that are difficult to read, in a bad position, too large or small, or of a distracting color. Avoid overwriting instructions or giving too much verbal information. Do not use too many lines to "organize" each step of the instructions. Give visual clues to what actions are required by the user. Make the brochure a size that is easy to put by the computer terminal. Finally, do not try to emphasize too much as that dilutes the purpose of the instructions.

Diagram of the screen with a list of abbreviations. This is often a minor element on a brochure, but does require some care. The description of what appears on the screen should be short and concise. However, do not set the type in very short lines as they are difficult to read. Locate the information close to what it describes, yet clearly separate it from the diagram. If the information is reproduced exactly as it appears on the CRT screen, it many need some enhancement such as highlights or arrows to indicate which element is being described. Rather than producing an exact reproduction of the screen, replace all the words with typeset words while maintaining the same size and positioning to improve legibility.

Overall, the quality of the written information in library online catalog brochures is very good and the concern for clarity is evident. There is little problem with the ideas for presenting information and instructions. The problems arise only in the execution of the design. The following guidelines should help focus on specific design issues to help present material well.

Part II—Guidelines for Design

After examining several brochures we have a general idea of the design issues involved. The following nine categories can serve as a checklist for designing or evaluating an informational brochure. Within each category are suggestions and guidelines to consider.

Budget and production method. The money available for a project varies greatly from library to library. Some were produced for next to nothing and some cost hundreds of dollars. The cost of any printed piece can be broken down into three areas: design, preparation of art, and printing. Because of the nature of these pieces, the printing costs—which are usually the greatest of the three—can be kept fairly low. One way to think of printing costs is to consider the number of operations done to the paper. One sheet of paper printed in black ink on both sides and folded is basic and inexpensive. By adding another color ink, higher quality paper, or another page, the cost will go up. Since there is little need for elaborate printing, more effort and money can be put into the design and preparation of art.

Perhaps the best way to handle the artwork is to suggest to a printer or graphic artist what you want done and let that person prepare the art. Be sure to have the artist accurately sketch the designs before making finished art and carefully discuss these sketches. Changes are easily and inexpensively made at this stage. Later changes in the production of art can be expensive. Also, keep the artwork simple. Try to eliminate photographs. Use simple line drawings or diagrams instead. If a typewriter is used for the type, remember that cutting and pasting the copy will get the layout exact before it is printed.

Printing process. There are essentially two types of reproductive methods available: offset printing, or one of a variety of quick-copy techniques. Offset printing will give very accurate, high quality reproductions and is cost effective on production runs of 100 copies or more. Quick-copy techniques usually produce a lower quality copy and are limited in their ability to reproduce photographs, fine detail, or large areas of ink. They are cost effective for simple, short runs of 100 or fewer copies. Both methods require the same careful design and art preparation. The better the art quality the better the reproduction will be.

Paper choice. There are a great variety of papers available for printing. What is required for a simple brochure is an inexpensive bond paper. It comes in many standard colors, weights, and finishes. A printer can give advice on the selection. Look for a light neutral color that shows good contrast with the ink (black). White is fine, but a buff, beige, or light grey is easier on the eyes. Avoid a very bright color like canary yellow, as it is difficult for the eye to adjust to; or a dark color like royal blue, as it creates a low contrast with the ink and is difficult to read quickly. The weight of the paper should be such that there is little or no show-through from the other side. Little show-through means that printing on the reverse will not show through and distract the reader. The finish on the paper should be matte since gloss finish is difficult to read.

Size and use. The size and shape of the brochure is important not only for printing costs but also for the intended use. In terms of printing, standard paper sizes are the least expensive (e.g., 8 1/2 inches x 11 inches, 9 inches x 12 inches, 8 1/2 inches x 14 inches, 11 inches x 14 inches). However, the brochures' intended use may demand other paper sizes or folded sizes. Questions such as where the piece will be placed; visibility; difficulty in switching eyes from the screen, to the keys, to the instructions; and placement to facilitate note taking will all affect the size and shape requirements. Generally speaking, a narrow, horizontal rectangle with the instructions listed vertically is the easiest to position and read. An 8 1/2 inch x 11 inch sheet, then, is too large and must be folded or cut when it is used.

Layout, grids, and sequence of information. The sequence of information is really an editorial job of grouping similar information and ordering these groups into a logical sequence. For design, then, groups of information are important. They can be seen as blocks of texture which must be laid out to form the composition and to create a logical pattern.

A grid is an organizational device used to give a sense of order to a layout composed of different size and shape elements. The grid helps to establish margins, spacing, and pattern. To use a grid, first determine where any folds will be then set margins at the edges of the paper and along the fold(s). The interior spaces can then be used for layout or broken into two or more vertical columns and divided horizontally into rows. When type or images are put down they can be made to fit these grid lines.

In the overall layout, aim for a sense of balance between elements. For instance, a large title needs to be balanced against some blank space or by a visual texture block such as written copy or an image. Instructions should be closely sequenced and in order but separated by blank space or a change in texture from other information. A term to remember to remind you to balance a composition with blank space is *horror vacui* (fear of open spaces), a common malady among novice designers.

Typography. The choice and use of typography is perhaps the most important element. There are four characteristics of type that you will wish to control very carefully: style, format, setting, and size or texture.

Type or letter forms can be divided into three general categories or *style*. Serif type is a combination of thick and thin strokes as well as little flairs or serifs at the end of each stroke. Serif typefaces are usually considered traditional and are the most legible for body copy. The second category is sans serif. These typefaces are characterized by uniform line widths and an absence of serifs. They may be used for copy but legibility suffers. The third category is decorative type. These styles vary widely and are usually characterized by very evident visual themes that are carried on through their particular alphabets. Decorative faces are reserved for headlines or display copy, but are difficult or nearly impossible to read in body copy. The following is a list of serif and sans serif typefaces considered "classic" body types.

Serif: Baskerville
Bodoni
Caslon
Century
Clarendon
Cooper
Garamond
Korinna
Melior
Palatino
Optima
Times Roman
Souvenir

Sans Serif: Avant Garde
Gill
Helvetica
Kabel
Univers
Antikva Grotesk

Since we recognize and read words by the visual pattern that forms them, the more distinctive the pattern of the individual letterforms that make up the words the easier they are to read. By examining three distinctly different letterforms in a given typeface—the *A*, *H*, and *O*—shows what the range of form in the typeface will be. In a good, readable typeface, the *A* should form a distinct triangle; the *H* should fit in a squared rectangle; and the *O* in a circle. If the letterforms all reflect one shape—e.g., Microgramma, which is based on the square—the typeface will be difficult to read.

Format refers to how the type is arranged on a page. There are many ways to lay out type and some that are familiar from books and advertising that are not appropriate for instructions. Reading phrases rather than complete sentences or paragraphs is quicker and easier and more appropriate for brochure information, when the image created by the language is not important. Arranging the type flush to the left margin and not flush to the right margin makes short sentences and phrases easier to read. This is called flush left/ragged right. Centered type and headlines are also difficult to read. A line length of two-and-one-half alphabets (the amount of space required to set the typeface from *A* to *Z* through two-and-one-half runs through the alphabet) is optimal reading length in a book. Make this the longest line length for step-by-step instructions.

Type may be set in a wide variety of sizes with different leadings or line spaces. Eight, nine, ten, and twelve points are the four most common sizes for reading type. There are 72 points to the inch. Of these the two larger, 10- and 12-point, are good sizes for instructions. Most books are set in 8-, 9-, or 10-point type. The space left between lines is also important for legibility. Generally, the larger the type the greater the space between lines. Ten-point type with a three-point leading would be appropriate for a list. The leading may be increased slightly for instructions where frequent referral is made. Single-spaced typewriter copy is approximately 9-point type with a

5-point leading. Typescript copy is more difficult to read than typeset copy primarily because of the equal spacing between letters and the generous spacing between lines. Another aspect of setting type that improves legibility is using lowercase letters rather than all capitals. The greater variations in letterform of the lowercase letters make word and phrase patterns more easily and quickly read. Short headlines may be set in all caps, but even they are more difficult to read than those set in upper- and lowercase letters.

Type can be used to give visual organization to the entire brochure. Once type is set it creates a block of texture that is seen as one unit or group of information. By organizing different kinds of information into different textural blocks, it is easier to scan through printed text for the desired information. There is also the opportunity to create a more interesting visual design without adding unnecessary and often distracting decorative elements.

There are many ways to manipulate the texture of type without changing its basic format. For example, choose a type style or family—e.g., Helvetica—and have it set flush left, ragged right on a two-and-a-half-inch line length. You may even specify the size and line spacing—e.g., 9-point type with a 2-point leading. There are still many variables with which to deal. Helvetica comes in a light, medium, or heavy line width in standard or italic style and expanded or condensed form. It can also be printed in different colors. Excluding the color option, there are over fifteen different textures that can be created with Helvetica, all set in the same basic format. This allows using the same type style throughout a piece of literature for consistency and legibility while retaining a great deal of design freedom for emphasis, organization, and visual appeal. A general rule-of-thumb for publication design is to use one type family throughout. If types are to be changed, however, use something very different. For example, if Helvetica is used as the basic type and a different style is desired for a headline, use a serif face like Garamond or a decorative face like Microgramma rather than another sans serif face. Also try to avoid using more than three different typefaces on any printed item. This includes the type used for the library logo or name.

An aspect of type size that is related to composition is contrast. It is desirable to create a good contrast between headlines and body copy. The two easiest ways are to exaggerate the size of the headlines—as magazines do—or to give empty or white space to the headline so it is set apart from the copy. A composition that contains some contrast either in type size or use of space will be visually more interesting and easier to read.

Writing may be considered abstract visual symbols. The most efficient communication of information without much emotional content uses short phrases and pictographs or symbols. For instructions, a short one-line phrase with a diagram or pictograph of the specific subject and perhaps an arrow or other symbol indicating the action makes for quick, accurate communication. The more abstract a pictograph symbol becomes the more emotive qualities it contains and the less specific its meaning. A good pictograph should closely represent its subject, be self-contained or enclosed in a basic shape, and have an equal balance of white and black (printed areas). In terms of layout, try not to scatter pictographs or other symbols throughout the copy. Scattered pictographs or symbols demand too much eye movement. By consistently grouping symbols or pictographs toward the end of a phrase, they will be easier to refer to.

Numbering, lists, and other reference clues are like symbols but are used in a more rigid or formal way. Usually they are sequential and should be positioned flush left and only slightly spaced from the copy. You are all familiar with spreadsheets that have a list that is flush to the left margin and data flush to the right margin. These sheets are difficult to refer to and you must follow with your finger to coordinate information. By keeping material flush left—but not necessarily to the margins—lists are easier to refer to.

A final design guideline concerns the use of organizational devices such as lines, boxes, and borders. Try to avoid them whenever you can. The reason is that they are so easily over—and badly—used. If you try to eliminate them the chances for abuse are reduced.

One of the most common abuses is to grid out, or box in, information on a spreadsheet. Putting each piece of information in its own box is the same as not putting any lines on at all; and the organization of information by subgroups is not improved. Consider using only horizontal lines to focus on strips of related information and let the columns of type create the implied vertical lines. If horizontal lines do not seem right, perhaps the layout for that particular information is wrong.

Decorative borders are another weak spot in many designs. If you think you need a border, chances are that the text does not look right with the layout. Rather than trying to correct the problem with borders, try manipulating the layout. Let the margins create the border and use lines for organization and emphasis.

There are many things to consider when designing a printed piece. Keeping in mind that the purpose of the brochure is to inform and not advertise will help and following basic rules of legibility and organization will improve effectiveness. This does not mean an informational brochure cannot be attractive. Rather, the ways to develop an attractive brochure are by carefully manipulating the type, space, and organizational devices. Adding decorative elements should be unnecessary. Whether using a typewriter or a printing press, carefully question and design the text, typeface, pictographs and symbols, and layout. These design principles are the best guides for producing effective instructional brochures.

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JONATHAN PRATTER
Foreign and International Law Librarian
Tarleton Law Library
University of Texas at Austin

Library Privacy in Context

The English word *private* comes from the Latin *privatus* meaning "withdrawn from public life, deprived of office, peculiar to oneself, or private," and which is itself the past participle of *privare,* meaning "to bereave or to deprive."[1] The Greek word *idiotes* means both "private person" and "ignorant, ill-informed person" and is derived from *idios* meaning both "private" and "peculiar" and which gives us the English *idiot* and *idiosyncrasy.*[2]

Hannah Arendt has suggested that a large part of what we consider the private and intimate realm was held by the classical Greeks to be the sphere of mere necessity and material dependence.[3] A citizen of classical Athens had to leave the family and household and enter the public realm—the *polis*—in order to achieve freedom and the realization of his human potential.[4] Arendt's view has been criticized recently, but even her critic concedes that life as a member of the *polis* was primary. "One's existence, one's values, one's fulfillment as a member of the human species was dependent on being a member of the *polis.*"[5]

All of this suggests that the classical civilizations had an idea of privacy that is foreign to ours today. They devoted a lot of attention to the question of what constitutes the good life. Yet they assigned a modest role to privacy as a part of life. Certainly consideration of the ancients does not require us to throw over our own understanding of privacy. It should bring us to give some thought to it as a value in modern life.

The Value of Privacy

It has been difficult even to settle on a definition of privacy. There have been enough variations to fuel a continuing debate about whether privacy is an integrated, coherent concept, or is instead an aggregation of distinct interests.[6] One attempt at a unitary definition is that privacy is the right to be let alone, but this is too vague and general to be of much help.[7] For Alan Westin, a leading commentator, privacy is the claim to control when and to what extent information about a person will be communicated to others.[8] A definition offered by Ruth Gavison is more comprehensive. Privacy is the limitation of access to a person, and this has three aspects: the limitation of information about a person, the limitation of the attention directed at a person, and the limitation of physical access to a person.[9] These aspects represent interests we have in seclusion or solitude, in freedom from observation or scrutiny, and in withholding information about ourselves.

What is the value of privacy? I lean toward thinking of privacy as an instrumental value. That approach lets us see how privacy is the means by which we attain other valued ends. There are several of these: creativity, reflection, psychological well-being, and individual autonomy. Privacy has been called the essential context for the development of relations founded on trust, love, or friendship.[10] There is wide agreement that privacy is indispensable in our modern world to the dignity of persons, to respect for persons, and to our fulfillment as persons.

But the matter is more complicated than that. Take the relation between privacy and liberty. It is widely agreed that a basic function of privacy is to insulate the individual from public scrutiny, to place a buffer between personal preference and prevailing social norms. But is it better to insulate ourselves from compliance with public norms? Shouldn't we instead challenge them openly and force them to change? Stanley Benn,[11] in an early article, captures this tension:

> It is not only the authorities we fear. We are all under strong pressure from our friends and neighbors to live up to the roles in which they cast us. If we disappoint them we risk disapproval, and what may be worse their ridicule. For many of us, we are free to be ourselves only within that area from which observers can legitimately be excluded. We need a sanctuary or retreat in which we can drop the mask, desist for a while from projecting on the world the image we want to be accepted as ourselves, an image that may reflect the values of our peers rather than the realities of our natures. To remain sane, we need a closed environment, open only to those we trust, with whom we have an unspoken understanding that whatever is revealed goes no further.
>
> Put in this way, however, the case for privacy begins to look like a claim to the conditions of life necessary only for second-grade men in a second-grade society. For the man who is truly independent—the autonomous man—is the one who has the strength of mind to resist the pressure to believe with the rest, and has the courage to act on his convictions....Socrates did not ask to be allowed to teach philosophy in private....Of course, there are not many like Socrates in any society....Not

> many of us perhaps have gone so far along the road to moral maturity that we can bear unrelenting exposure to criticism without flinching.

Benn's view may strike the reader as rigorous, even naïve. It needs to be qualified by Gavison's perspective[12] on the same problem.

> There are important limits on our capacity to change positive morality, and thus to affect social pressures to conform. This may even cause an inability to change institutional norms....If an individual prefers to present a public conformity rather than an unconventional autonomy, that is his choice....Ideally, it would be preferable if we could all disregard prejudices and irrelevancies. It is clear, however, that we cannot. Given this fact, it may be best to let one's ignorance mitigate one's prejudice.

The Principles of Fair Information Practices

Concern about the collection of large amounts of personal information by both public and private organizations emerged as a major issue during the 1960s and early 1970s. The response of some institutions, including libraries, has been substantial enough that by 1982 Arthur Miller, one of the first to sound an alarm in his *Assault on Privacy,*[13] was prepared to say that a "Privacy Revolution" had taken place.[14] An early and influential discussion of the problem was *Records, Computers and the Rights of Citizens.*[15] This was a report issued in 1973 by an advisory committee to the Secretary of the U.S. Department of Health, Education and Welfare. It was the first report to develop the idea of fair information practices. These principles have had a substantial impact on the formulation of public policy regarding large-scale personal data gathering.

The principles of fair information practices can be stated briefly:[16]

1. There must be no personal-data recordkeeping systems whose existence is secret.
2. There must be a way to find out what information about a person is in a record and how it is used.
3. There must be a way for an individual to prevent information about him obtained for one purpose from being used or made available for other purposes without his consent.
4. There must be a way for an individual to correct or amend a record of personal information about him.
5. Any organization creating, using, or disseminating records of personal data must assure the reliability of the data for its intended use and must take reasonable precautions to prevent its misuse.

Reliability here means the combination of accuracy, completeness, timeliness, and pertinence. Timeliness requires that information which has become "stale" be purged from a record of personal information.

The first two principles have to do with simple disclosure. The fourth principle and much of the fifth are grounded on a requirement of fairness or due process. The critics of organizational gathering of personal data have often expressed the concern that decisions are made about people's lives without any assurance of the accuracy or completeness of the supporting information. The result is an increased risk that decisions will be wrong because of an inaccurate, distorted, or superficial record. This has more to do with fairness in decision-making than with privacy. In any case, the concern is legitimate.

The third principle imposes a restriction on the movement and use of personal data. It speaks to a public expectation that information shall be used only by the organization to which the disclosure was made. Strict application of this principle would prevent the commingling of information in a single database, as well as the passing of one database against another in order to identify correspondences.

The principle of pertinence demands that only information which is relevant will be considered. It recognizes that unfairly prejudicial information, information which should have no bearing on decision-making, must be kept out of personal data records. The timeliness principle acknowledges that with the passage of time and changes in circumstances personal information becomes "stale." It requires that only relatively recent information be retained in data files.

Experience has taught us that substantive restrictions on the collection of information by organizations are necessary. But not everyone agrees. Richard Posner, an economist who has written provocative articles on privacy, insists that we should credit users of information with the ability to be rational discounters of its relevance and importance. He sternly disapproves of legislative intervention that imposes restrictions on the consideration of discreditable personal data.[17] For example, he objects strenuously to provisions of the "Fair Credit Reporting Act" which prevent reporting of bankruptcies more than ten years old or of criminal convictions more than seven years old.[18]

Legal Aspects of Library Privacy

At the same time that general privacy concerns began to emerge, the issue of privacy in library circulation records came rapidly into view. During the spring and summer of 1970 agents of the U.S. Bureau of Alcohol, Tobacco and Firearms attempted to examine the circulation records of public libraries in several cities. The American Library Association responded quickly to the threat that rummaging through library circulation records was on the point of becoming a standard "investigative technique" of some law enforcement agencies. The "ALA Policy on Confidentiality of Library Records" was approved in January of 1971 and with minor revisions continues in effect today.[19]

Section 1 of the policy recommends that each library "formally adopt a policy which specifically recognizes its circulation records and other records identifying the names of library users to be confidential in nature." Section 2 expands on the general statement by recommending that patron records not be disclosed to any government agency "except pursuant to such process, order, or subpoena as may be authorized under the authority of, and pursuant to, federal, state, or local law...." Section 3 recommends that libraries "resist the issuance or enforcement of any such process, order, or subpoena until such time as proper showing of good cause has been made in a court of competent jurisdiction." The ALA policy is commendable for its clarity, except on one account. Neither Section 3 nor any of the accompanying materials gives any guidance on what is involved in resisting the enforcement of a subpoena.

The first difficulty is that a subpoena is issued ex parte, that is, at the request of those seeking the witness' attendance and without the participation of anyone else. An attorney or prosecutor, in connection with pending litigation or a criminal investigation, need only send a request for a subpoena to the clerk of the court. The subpoena will be issued as a matter of course. So, contrary to Section 3 of the ALA policy, it is usually impossible beforehand to resist the issuance of a subpoena.

A second difficulty is that it may not be up to the party seeking to enforce the subpoena to show that there is good cause for it. On the contrary, the library officers may have to take formal legal action of their own. They may have to file a motion challenging the subpoena and requesting a hearing before a judge of the court that issued it.[20] The usual name for this procedure is a motion to quash the subpoena.

The most significant recent legal development for privacy in libraries is the enactment of library confidentiality statutes. At last count twenty-three states had passed laws requiring that patron records be kept confidential.[21] These statutes are remarkable for their variety (or lack of uniformity), though they can be classed into two main groups. One group is composed of exceptions to a general open records statute, the other, of independent library privacy acts.[22]

With one exception the prohibition of disclosure is absolute in the sense that there is no provision for the exercise of discretion by the custodian of the records, the librarian. The exception is the Iowa statute[23] which reads in part:

> The following public records shall be kept confidential, unless otherwise ordered by a court, by the lawful custodian of the records, or by another person duly authorized to release information....13. The records of a library which, by themselves or when examined with other public

> records, would reveal the identity of the library patron checking out or requesting an item from the library.

The first part of the statute dispenses with an absolute duty and leaves room for an independent decision by the librarian. Notice that the strength of the statute as a ground for the refusal to disclose records remains intact.

Some statutes actually impose civil or criminal liability for the improper disclosure of information about a library patron.[24] That is unnecessary. An ethical obligation can be enforced without having to be transformed into a legal duty. Complaint, criticism, and reprimand can all be brought to bear to enforce ethical standards.

May civil liability be imposed under a library confidentiality statute that says nothing about it? It is possible. A common-law rule permits it. The *Second Restatement of Torts*[25] puts the rule this way:

> When a legislative provision protects a class of persons by proscribing or requiring certain conduct but does not provide a civil remedy for the violation, the court may, if it determines that the remedy is appropriate in furtherance of the purpose of the legislation and needed to assure the effectiveness of the provision, accord to an injured member of the class a right of action, using a suitable existing tort action or a new cause of action analogous to an existing tort action.

I am not aware that a lawsuit for breach of confidence has been brought against a librarian. Now that the possibility exists, my concern is that librarians did not adequately consider beforehand the implications of enacting library confidentiality statutes. The statutes' purpose was to find an adequate means of protecting library patrons. Librarians' altruism may have obscured the prudential implications of imposing a legal duty. Ultimately, a judgment of the wisdom of shouldering this duty will depend on librarians' view of its importance for maintaining ethical standards and of the potential for harm to our patrons that might flow from a breach.

A case arising under the Iowa library confidentiality statute was decided by the Iowa Supreme Court in 1983.[26] The court denied claims that a sweeping subpoena to the Des Moines Public Library violated the first-amendment rights of patrons and was unreasonable and oppressive. A recent casenote in the *Iowa Law Review* discusses the case *(Brown* v. *Johnston)* in detail.[27] The author points out that the court's first-amendment analysis was inadequate. The article presents a good argument in favor of a constitutional right of privacy in public library circulation records.

> If the first amendment is to ensure an informed citizenry by guaranteeing a right to receive information and ideas; a right to privacy in library circulation records should be extended to public library patrons. Compelled disclosure of library records, like forced disclosure of organizational membership, would discourage individuals from seeking or

> receiving unpopular or controversial ideas contained in certain books because other people might learn of their inquiries and take retaliatory economic or social steps to discourage the library patrons' further inquiry.[28]

The Iowa legislature responded quickly to the *Brown* decision. It passed an amendment to the confidentiality statute.

> The records shall be released to a criminal justice agency only pursuant to an investigation of a particular person or organization suspected of committing a known crime. The records shall be released only upon a judicial determination that a rational connection exists between the requested release of information and a legitimate end and that the need for the information is cogent and compelling.[29]

This addition plus the provision for the exercise of discretion make the Iowa statute nearly ideal.

Suggestions for Assuring Library Privacy

Here are some suggestions and considerations for implementing a confidentiality assurance program in the library. The library's confidentiality policy should be included in the personnel manual and discussed with staff members. Circulation procedures should be reviewed to locate points where accidental disclosures might occur. Do overdue and reserve notices go out on postcards or in envelopes? If notices are given over the telephone, it may be necessary to have the patron return the call if someone else answers.

How much information should be requested at the time of registration? Librarians should be pleased that libraries have come to be viewed as informal institutions. Nevertheless, users have to tolerate some degree of control.

Do any of the library's services use interest profiles? If so, how detailed are they? Is access to them restricted?

What happens to circulation information after materials have been returned and fines paid? Is it purged from an online system? Are any hardcopy records maintained? It is impossible to subpoena records that do not exist.

What is the policy for releasing records as part of an investigation or prosecution for library theft? There may be a technical conflict here with a confidentiality statute.

Many libraries are public places. It would be impossible to achieve the privacy of a doctor's office in a public library nor should it be tried. Patrons do not require or expect that a public library prevent all possibility of disclosure. They do expect that library personnel will take precautions to prevent unnecessary or intrusive disclosures.

Implications of the Computer

It is fair to say that the advent of the computer played a significant role in precipitating our present concern with the security of personal information. Of course, the collection of information about people began well before the arrival of the computer; the federal income tax was instituted in 1913, social security in 1936. But it is the added potential of computerized data banks and advanced telecommunications which continue to fuel the debate.

Few people would deny that the growth of advanced information technology presents the risk of harm to privacy. But it is equally difficult to ignore the benefits that clearly have been derived from this technology. These observations can only begin the inquiry. They pose the question of whether society will be able to integrate the new technology without jeopardizing important privacy values.

I think the major risks come under the rubric of abuse or misuse. Problems such as unauthorized surveillance, intentional breaches of computer security, or the use of personal information for purposes beyond those for which it was disclosed ought to be regarded as abuses to be prevented and deterred, not as inevitable consequences. The rigorous application of the principles of fair information practices would go a long way toward preventing such abuses.

There is another question to confront. Is it possible that too much ostensibly innocuous information about the individual could be collected, even for purely benign purposes? Would people then "think more carefully before they did things that become part of the record?"[30] Would life become "less spontaneous and more measured?"[31] The United States could no doubt reach such a point, though it is to be hoped that the working of a democratic society would stop well short of it. These are difficult issues and it has been my intention here merely to raise them rather than to offer solutions. Whatever the answers society determines, librarians and other information specialists are well-placed to contribute to the debate.

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